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ANNALS OF INTERNAL MEDICINE

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DEPARTMENT OF REVIEWS

The Journal will make an especial feature of the review of monographs and books bearing upon the field of Internal Medicine. Authors and publishers wishing to subject such material for the purpose of review should send it to the editor. While obviously impossible to make extended reviews of all material, an acknowledgment of all matter sent will be made in the department of reviews.

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Rich Liver Diet in the Treatment of Anemias With Reports of Cases

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THIS paper is a report of six cases of pernicious anemia, four cases of secondary anemia, one case of atypical secondary anemia, and one case of Hodgkin's Disease treated by a diet rich in liver, after the method of Minot and Murphy (1).

Whipple and Robbins (2) have said: "Any person who works with standard anemia dogs, and observes the ease with which hemoglobin regeneration can be controlled by diet factors, comes to believe that many types of human anemia may be treated to advantage by diet control, rather than by other methods."

Prior to the Minot and Murphy paper of last year, very little consideration had been given to diet in the management of the anemias. Transfusions and iron and arsenic were used in the treatment of these cases. Following the Minot and Murphy report, however, much impetus was given to the dietary management of primary and secondary anemias.

The following cases were observed, either on the medical service at the Meriden Hospital, or in private practice. In all cases dilute hydrochloric acid was used, the usual dosage being a teaspoonful three times daily. In no cases was iron or arsenic given.

The diet as outlined by Minot and

Murphy was strictly adhered to in all cases of primary anemia, and in the severe cases of secondary anemia. The diet outlined in ounces for the benefit of patients is as follows:

Calf or beef liver, sweet-
breads, or kidney....4 to 8 ounces
Lamb or beef4 to 8 ounces
Vegetables (particularly
spinach and lettuce)... 16 ounces
Fresh fruit 8 to 16 ounces
Milk 8 ounces
One egg.
One ounce of fat made
up of butter and
cream.

In the moderately severe cases of secondary anemia, a diet which was arbitrarily called a modified Minot diet was used. With this latter diet the patient was advised to restrict fats and to take generously of liver or kidney, or sweetbreads, lamb, or beef, green vegetables, and fruits. The response to the diet was very much more rapid in the cases of secondary anemia than in the primary anemia.

Recently McCollum (3), Simmonds and Becker have reported their work with vitamin E. They conclude that liver fats contain large amounts of vitamin E and iron, and believe that the value of the liver diet recommended by Minot and Murphy lies in its content of vitamin E and of iron.

It is fair to presume that the real value of the treatment is in the use of liver itself, and that probably the future will bring forth something in the way of liver fats or emulsions to manage these cases. This is of value because it is not uncommon to receive complaints from patients who tire of the strict dietary regimen. If in the future these people are permitted to take a regular diet, and in addition liver fats, the problem will be made much easier, both for patient and physician.

The economic problem, always a great one in the care of people with pernicious anemia, has very largely been solved by the new dietary regimen. In the past with the prognosis eventually bad, it seemed hard to have to send these people repeatedly to the hospital for transfusion. The hospital had to be paid, likewise the donor, occasionally the physician, and all of this with a known hopeless prognosis. The dietary regimen would seem to be within the reach of all.

That the liver diet has a specific action seem to have been proven by the recent work of Murphy (4) and his co-workers. They have shown definite changes in the blood composition in cases of pernicious anemia, treated with a rich liver diet. In this work they report a definite increase in reticulocytes which occurs usually between the fourth and tenth days. This is associated with a decrease in the bile pigment concentration. Coincidentally there is an increase in the red cell count, and hemoglobin concentration, and a return to a color index of one or less than one. The liver diet did not produce any change in the non-

protein nitrogen of the plasma, although the protein of the corpuscles increased markedly.

REPORTS OF CASES

Primary Anemia

Mrs. E. P. Age: 37 years.

Admitted to hospital October 5, 1926. History of increasing pallor, and weakness of two months duration. Sickly, yellowish pallor of skin. Tongue smooth. Slight oedema of lower extremities. Gastric contents showed no free HCL. Gastro-intestinal X-ray series negative. R. B. C. on admission, 1,570,000, Hb. 30%, W. B. C. 7,600. Smear typical of primary anemia. Blood Wassermann negative. Spinal Fluid Wassermann negative. Cell count 6, Blood Nitrogen 36 mgs. Blood Sugar 105 mgs. Clinical Diagnosis: Primary anemia.

Treatment: Minot diet.

Dilute hydrochloric acid, 1 dr. T. I. D.

Patient showed almost immediate clinical improvement; headaches disappeared, she felt much stronger, lost all gastric symptoms, color became better. Discharged after thirty days in hospital with R. B. C. 3,550,000, Hb. 60%. Count two weeks after discharge, 4,580,000 with Hb. 90%. Patient looks and feels entirely well. Reported on March 1st as being entirely well. Hb. 90%. Had not been entirely adhering to regimen.

BLOOD PICTURE

Date.	R. B. C.	Hb.	W. B. C.
10/5/26	1,570,000	30%	7,600
10/7/26	1,880,000	30%	7,600
10/11/26	1,840,000	34%	12,400
10/14/26	1,940,000	35%	7,000
10/20/26	2,200,000	45%	4,800
10/18/26	2,660,000	45%	6,200
10/23/26	2,290,000	55%	5,500
10/26/26	2,120,000	65%	6,400
10/28/26	2,870,000	65%	5,800
10/31/26	3,480,000	55%	7,200
11/2/26	3,777,000	55%	5,800
11/4/26	3,590,000	60%	5,300
11/6/26	3,550,000	60%	7,800
11/20/26	4,580,000	86%	7,400

Mr. W. B. Age: 34 years.

Patient was first seen December 1, 1922 with the usual signs of pernicious anemia: indigestion, weakness, exhaustion, and sore tongue. R. B. C. 2,352,000. W. B. C. 3,600. Hb. 50%. Patient was transfused twice at that time.

In this case it was noticed that the patient apparently commenced to relapse and he was placed on rigid Minot diet. His response was almost immediate, with a marked increase in red cells, and hemoglobin. The last count showed a very definite improvement, not only subjectively, but in general appearance of the man and the blood picture.

Primary Anemia With Central Nervous Symptoms

Mrs. J. G. Age: 45 years.

Patient admitted December 29, 1926, complaining of generalized weakness, numbness and weakness in lower extremities; vague complaints referable to stomach. On examination patient was an undernourished, pale, prematurely gray woman. Large patches of brownish pigmentation over skin. Tongue red, and smooth.

Gastric analysis showed achlorhydria. Spinal fluid negative. R. B. C. 3,390,000. W. B. C. 5,200. Hb. 70%. Put on Minot's diet, Hydrochloric acid, dr. i, T. I. D. before meals.

BLOOD PICTURE			
Date.	R. B. C.	HGB.	W. B. C.
12/29/26	3,390,000	70%	5,200
12/30/26	3,420,000	60%	5,800
1/3/27	3,080,000	51%	5,400
1/8/27	3,940,000	60%	5,200
1/10/27	3,600,000	70%	6,000
1/13/27	4,120,000	75%	6,600
1/15/27	4,000,000	85%	5,800
1/19/27	4,030,000	90%	6,200
1/22/27	4,380,000	90%	7,400
1/25/27	4,670,000	85%	7,800
1/29/27	4,040,000	80%	7,800
Date.	R. B. C.	W. B. C.	HGB
Feb. 9, 1923.	5,928,000		100%
April, 1923.	5,084,000	5,400	60%
June 6, 1923.	4,800,000	6,200	70%

Was seen again on June 5, 1926 with a history that he has been feeling tired for the

past month, and indigestion and weak feeling.

Date	R. B. C.	W. B. C.	HGB.
June 5, 1926	4,224,000	4,000	70%
June 8, 1926.	Was given 475 c.c. of citrate of blood.		

June 13, 1926. Was given 500 c.c. of citrate of blood.

Date	R. B. C.	W. B. C.	HGB.
June 22, 1926.	4,780,000	7,600	80%
July 13, 1926.	4,016,000	7,400	70%
Nov. 22, 1926.	3,200,000	7,000	70%

At this point patient complained of exhaustion, sore tongue, and headache, and was placed on rigid Minot diet.

Date	R. B. C.	W. B. C.	HGB.
Dec. 20, 1926.	4,608,000	4,800	80%
Feb. 14, 1927.	5,120,000	8,600	92%

Patient did very well, became stronger, gastric symptoms disappeared, color improved. No improvement, however, in power of legs nor in numbness. Paresthesia in legs still present on discharge. Stay in hospital was thirty-seven days.

Primary Anemia.

Miss A. S. Age: 42 years.

Entered hospital, February 7, 1927. Patient gives history of anemia of some years duration. Has been quite weak of late; breathlessness on exertion, dizziness.

On examination, patient showed typical findings of primary anemia. R. B. C. 2,370,000. W. B. C. 4,800. Hgb. 40%. Gastric contents showed no free hydrochloric acid.

Patient put on rigid Minot's regime-diet, and hydrochloric acid.

BLOOD PICTURE			
Date	R. B. C.	W. B. C.	Hb.
2/7/27	2,370,000	4,800	40%
2/9/27	2,320,000	4,600	42%
2/11/27	2,580,000	5,000	38%
2/14/27	3,090,000	4,400	40%
2/16/27	3,010,000	5,200	40%
2/18/27	3,090,000	5,000	40%
2/21/27	3,840,000	6,200	48%
2/23/27	3,220,000	5,800	44%
2/25/27	3,400,000	6,000	50%
2/28/27	3,660,000	6,200	46%

3/2/27	3,720,000	5,400	48%
3/4/27	3,890,000	5,400	50%
3/7/27	3,980,000	5,600	56%
3/9/27	3,980,000	6,000	52%
3/11/27	3,990,000	6,800	52%
3/13/27	3,990,000	6,800	60%
4/15/27	4,480,000	6,400	80%

Symptomatic improvement very rapid, appearance improved, strength returned, red blood count increased gradually, and on discharge, March 13, 1927 after thirty-four days in hospital, red blood count was 3,990,000. On April 15, 1927, R. B. C. 4,480,000, W. B. C. 6,400, Hb. 80%.

Mrs. E. B. Age: 42 years.

Was seen on the 24th of April, 1926 with the usual signs of pernicious anemia, exhaustion, swelling of feet, mucous membranes pale, and sore tongue. R. B. C. 3,360,000, W. B. C. 6,000, Hb. 50%. Patient was placed on Minot diet.

BLOOD PICTURE			
Date	R. B. C.	W. B. C.	Hb.
5/22/26	3,320,000	6,200	70%
6/19/26	3,060,000	7,000	68%
7/24/26	3,180,000	7,400	60%
9/4/26	3,200,000	8,600	70%
10/9/26	3,840,000	6,800	70%
At this time patient was placed on Minot diet.			
Date	R. B. C.	W. B. C.	Hb.
11/6/27	4,704,000	4,800	70%
1/8/27	4,720,000	7,800	85%
3/12/27	4,804,000	8,400	80%

In this patient it is seen that the response to medication prior to the use of the high protein diet was very slow. The improvement with the dietary management of the case however, was at once noticeable.

Secondary Anemia.

Mrs. L. M. Age: 27 years.

Admitted to hospital October 28, 1923. Has had recurrent attacks of rheumatic fever over a period of years, chorea in childhood. Came into hospital because of recurrence of rheumatic fever, and early symptoms of heart failure.

Patient showed marked pallor of skin and mucous membranes, several swollen tender points. Signs of early congestive heart failure. Heart shows signs of mitral stenosis,

and insufficiency. Blood count on admission: R. B. C. 3,320,000, W. B. C. 5,100, Hgb. 70%. Put on Minot's diet; no hydrochloric acid. Specific treatment for rheumatic fever.

BLOOD PICTURE			
Date	R. B. C.	W. B. C.	Hb.
10/28/26	3,320,000	5,100	75%
11/6/26	3,720,000	8,700	65%
11/10/26	3,380,000	8,200	74%
11/12/26	4,220,000	6,800	72%
11/15/24	4,970,000	7,000	73%
11/24/26	5,520,000	7,800	75%

Red blood count went up quite rapidly, patient's general condition improved. Discharged in good condition, November 29, 1926. R. B. C. on discharge 5,520,000, Hgb. 80%. Stay in hospital, twenty-seven days.

Secondary Anemia

Mrs. M. S. Age: 37 years.

Patient entered hospital December 9, 1926 with history of bleeding from hemorrhoids for two months, or more. Had lost weight. On admission was very weak, pale, had frequent dizzy spells. Dyspnea, and palpitation on exertion, numbness, and tingling of extremities, swelling of ankle.

On admission R. B. C. was 2,470,000, with Hgb. 42%. Smear showed changes of a marked secondary anemia. Patient put on Minot's diet with hydrochloric acid. In spite of some continued bleeding from rectum, the red blood count went up to 3,680,000 on January 8, 1927. Hemorrhoidectomy performed January 10, 1927. Patient discharged January 12, 1927 with R. B. C. of 3,790,000. Felt quite well on discharge.

BLOOD PICTURE		
Date	R. B. C.	Hgb.
12/9/26	2,470,000	42%
12/10/26	2,370,000	46%
12/15/26	2,630,000	46%
12/18/26	2,840,000	52%
12/22/26	3,150,000	54%
12/28/26	3,630,000	50%
12/31/26	3,290,000	58%
1/4/27	3,140,000	52%
1/8/27	3,680,000	54%
1/12/27	3,580,000	50%
1/14/27	3,790,000	50%

Mrs. L. H. Age: 46 years.

Patient admitted to hospital December 12, 1926. She was suffering from advanced congestive heart failure, showed marked oedema, was vomiting a great deal, and was extremely weak. Could take no diet at first. With digitalization, and diuretics, patient's condition improved. However, R. B. C. which was 2,570,000 on admission, was only 2,650,000 on December 23, 1926, thirteen days after admission. On latter date, Minot's regimen was started with hydrochloric acid dr. 1, T. I. D. General condition improved still more rapidly, and red count mounted rapidly, being 4,140,000 on January 27, 1927, thirty-five days after introduction of the diet, and forty-nine days after admission to hospital.

BLOOD PICTURE

Date	R. B. C.	Hgb.
12/13/26	2,570,000	45%
12/23/26	2,650,000	50%
12/27/26	3,190,000	60%
12/31/26	3,200,000	62%
1/4/27	3,690,000	48%
1/10/27	3,480,000	45%
1/13/27	3,820,000	65%
1/12/27	4,040,000	60%
1/20/27	3,750,000	65%
1/24/27	4,080,000	70%
1/27/27	4,140,000	75%

Mrs. J. F. Age: 42 years.

Patient was seen on October 2, 1926 with a history of exhaustion, weakness of arms, constipation, some pain in left side of chest. Menstrual periods lasting seven or eight days; appetite poor.

The only positive sign was a slight enlargement of the heart. The pelvic examination which was done by Dr. James F. Miller of Hartford was negative for fibroid or malignancy. Blood Wassermann negative. Nonprotein nitrogen 22 mgs. in 100 c. c. of blood. Blood sugar 105 mgs. in 100 c. c. of blood. Urine—1018 acid clear, albumin and sugar negative. R. B. C. 3,200,000, W. B. C. 6,000, Hgb. 50%, Polymorphonuclears 67%, Large lymphocytes 9%, Small lymphocytes 24%.

Diagnosis: *Secondary anemia.*

Artificial menopause was produced with radium.

BLOOD PICTURE

Date	R. B. C.	W. B. C.	Hgb.
12/22/26	2,940,000	5,400	45%
Placed on Minot diet.			
1/20/27	3,800,000	7,000	55%
2/22/27	4,456,000	6,800	70%
3/24/27	4,712,000	8,000	78%

Clinically the patient has improved very much. She looks better. Color is very much better.

J. S. Age: 14 years.

Patient was admitted to hospital on December 30, 1926. The chief complaint at this time was respiratory embarrassment. He coughed some. The past history excepting the usual children's diseases was negative. He was undernourished. The positive findings were enlarged cervical axillary and inguinal glands, spleen and liver were palpable, there was a soft systolic murmur at the apex. An X-ray of the chest showed massive mediastinal enlargement. The blood Wassermann was negative. Blood sugar 88 mgs. in 100 c. c. of blood. Non-protein nitrogen 20.5 mgs in 100 c. c. of blood R. B. C. 3,820,000, W. B. C. 20,000, Hgb. 60%, Polymorphonuclears 74%, Small lymphocytes 19%, Large lymphocytes 7%. On January 1, 1927, one of the enlarged axillary glands was removed. Biopsy report showed typical picture of Hodgkin's Disease. The patient had several severe attacks of respiratory embarrassment. At intervals the temperature was elevated for several days. The patient has gradually grown worse. The following blood picture before and after Minot's diet is outlined below.

Atypical Secondary Anemia.

W. S. Age: 67 years.

Patient was seen on February 1, 1927 with the usual history of tiring easily, occasional attacks of dizziness. Past History negative except for rheumatism 20 years ago. The positive physical signs were: Skin and mucous membranes pale, soft systolic murmur at apex of heart, heart irregular.

Date	BLOOD PICTURE					
	R.B.C.	W.B.C.	Hgb.	Polys.	Lrg.	Sm.
			%	%	%	%
12/30/26	3,820,000	20,000	60	74	7	13
1/5/27	3,460,000	17,200	70	87	8	5
2/16/27	2,980,000	15,000	70	74	11	15

At this point the patient was placed on a rigid Minot diet.

Date	R.B.C.	W.B.C.	Hgb.				Polys.	Lrg.	Sm.
			%	%	%	%			
2/19/27	2,990,000	17,000	50	84	10	6			
2/28/27	3,410,000	28,600	60	85	6	9			
3/7/27	3,460,000	17,400	50	85	7	8			
3/15/27	3,810,000	14,000	70	80	11	9			
3/19/27	4,100,000	17,000	80	80	12	8			
4/1/27	4,350,000	24,600	60	90	6	4			

The very unusual thing about this case is that while the condition of this patient has grown worse, the blood picture under Minot's diet has improved very much.

Spleen and liver palpable. Left inguinal hernia. Wassermann negative. Blood Sugar, 120 mgs. in 100 c. c. of blood. Non-protein nitrogen, 28 mgs. in 100 c. c. of blood. R. B. C. 3,872,000, Hgb. 40%, W. B. C. 8,800. Polymorphonuclears 56%. Large lymphocytes 11%, Small lymphocytes 35%.

The patient was placed on Minot's diet, and dilute hydrochloric acid.

Date	BLOOD PICTURE		
	R. B. C.	W. B. C.	Hgb.
2/22/27	3,900,000	8,400	60%
3/17/27	4,100,000	7,800	60%
3/25/27	4,160,000	7,000	65%
4/8/27	4,300,000	8,200	75%
4/20/27	4,456,000	11,200	70%

The smears showed changes in the shape and size of the red cells, and marked achromia.

Mrs. S. R. Age: 46 years.

Past History: Patient had gastro-enterostomy done in 1912. Hysterectomy for fibroid in 1917. She was seen for present condition on November 20, 1926. Her chief complaint was great weakness.

The positive findings were cyanosis of lips, finger tips, throat, and tongue. R. B. C. 3,352,000, W. B. C. 5,400, Hb. 68%. A definite change in the shape and size of the red cells was noted. Spectroscopic examination showed no methemoglobin. A diagno-

sis of pernicious anemia was made, and patient was placed on Minot diet.

Date	BLOOD PICTURE		
	R. B. C.	W. B. C.	Hgb.
12/28/26	4,040,000	6,600	70%
1/18/27	4,504,000	7,200	68%
3/10/27	4,260,000	6,000	62%
4/11/27	4,800,000	8,600	75%

The patient has improved very much. Cyanosis and weakness disappeared. The patient is feeling very much better.

CONCLUSIONS

1. While it is true that the number of cases in this series is certainly limited, the uniform success obtained in bringing up the blood picture together with the clinical improvement can not be overlooked.

2. The Minot and Murphy regimen seems to have a very definite place in the treatment of anemias, either primary or secondary. It is noteworthy that improvement in the blood picture is slow and gradual for the first three weeks or so, but thereafter, in favorable cases, it progresses rapidly.

3. It is probable that the real value of the treatment is due to the presence of iron and vitamin E in liver.

4. The economic question seems to have been solved by this method of treatment. This is particularly true in those cases which formerly required repeated transfusions.

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Anemia of Pregnancy

BY V. C. ROWLAND, M. D., *Cleveland, Ohio.*

IN 1924 the writer reported (A. M. A. J., February 2, 1924) two cases of hemolytic anemia of pregnancy and reviewed the literature up to that date. At that time the condition as a clinical entity was entirely unfamiliar to the obstetricians of Cleveland and no previous case record was found. In the brief period since that time at least four cases have been recognized in Cleveland. These cases and the literature of the last three years are to be considered in the present report.

The clinical picture may be recalled as follows: An insidious onset of anemia in the latter weeks of pregnancy often not recognized till in the puerperium. Usually, however there are symptoms ante-partum of weakness, breathlessness on exertion, palpitation, headaches, dizziness, some edema of the feet and occasionally, an associated definite toxemia of pregnancy with albuminuria and hypertension. On account of the toxemia, the anemia may be overlooked if the blood is not examined. Labor may come on prematurely, is characteristically short and relatively painless. Post partum bleeding is scant. Still birth may occur, but a living child does not share in the anemia and develops normally.

Labor aggravates the anemia. The patient may go into collapse at once after parturition if the anemia is quite marked. Typically however, there is the rapid progression in the anemia in the first week or two following delivery. At times this course is quite slow so that a serious degree of anemia is recognized only after two months or more of supposedly simply delay in convalescence and returning strength.

The type of the anemia in the reported cases has shown a rather confusing variation and one of the most definite advances in our knowledge of the condition in the last few years is the definite division into two groups namely those that are hematologically secondary and those that are hematologically primary anemias. This was pointed out by Esch, who made the first complete study of the whole subject in 1917. He now insists that the two groups are quite distinct, and that no cases of the secondary or chloroanemia, even though of high grade, ever pass over into the pernicious type. The secondary types may persist many months or even years later, resisting treatment. For example, he reports a woman of 27 showing post partum, 34% Hemoglobin, 3,472,000 red cells, color index .5, who nursed her baby 11 months and two years post partum showed 30% hemoglobin, 3,145,000 reds and .5 color index. Naegeli also

*Clinic at St. Luke's Hospital for the American College of Physicians, Cleveland, February 21-25, 1927.

describes the stubborn anemias of the chlorotic constitution. Normally however, these pregnancy anemias steadily clear up after the post partum period. Transfusion hastens convalescence but is hardly indispensable as in the pernicious types of cases.

The second group, namely hematologically primary anemias, usually present the blood picture of pernicious anemia with an occasional aplastic or atypical form as reported by Larrabee. The latter reported seventeen cases of anemia of pregnancy all of severe grade. Seven of these were of the secondary type and all recovered mostly without transfusion. Eight cases presented the pernicious blood picture and of four not transfused three died. Four recovered after transfusion. One case of the aplastic type died in spite of transfusion. One highly atypical case recovered after removal of a greatly enlarged spleen, repeated transfusions having been unsuccessful. In this case seven transfusions within six weeks, totaling 3700 c. c. of blood were used. The patient, however, had previously had recurrent endocarditis and pericarditis with albuminuria and edema. Larrabee's cases would also indicate that the primary type of the anemia occurred more frequently in primiparae similar to a toxemia with special involvement of the blood forming tissues (*Hematopathia gravidarum*), while the secondary type occurs more frequently after a series of pregnancies and other debilitating factors. In the primary form, a family history of hemophilia or an hereditary tendency to anemia may be an important predisposing factor as in some cases of

pernicious anemia unassociated with pregnancy.

Benda has made some special studies of the pathology in pregnancy anemias and reports a decrease in blood cholesterol in contrast to the usual increase in pregnancy and also at autopsy an atrophy of the suprarenals in contrast to the usual hypertrophy in pregnancy. On the basis of the hypocholesterolemia, Dorle and Sperling administered cholesterol therapeutically and report an increased red blood count and increased resistance of erythrocytes within a few hours both in experimental animals and in patients. They used .08 gram in milk three times a day.

Drexel reported a case having several practical implications. The patient was pale from the beginning of her pregnancy and at four months was hospitalized with a definite anemia and an acute pyelitis. The latter cleared up but the anemia progressed to 25% hemoglobin and 1,500,000 red cells. At six months a hysterectomy was done under spinal anesthesia. A rapid and good convalescence followed. In eight weeks, the blood showed 64% hemoglobin and 3,800,000 cells. The case is significant in the early onset of the anemia and in that the course was apparently uninfluenced by the urinary infection but entirely dependent on the pregnancy itself.

Schneider reported a case in a woman of 41, para III, with a history of hemophilia among the male members of the family. The patient developed an increasing anemia and was given intensive medicinal treatment but the anemia progressed to 40% hemoglobin and 1,920,000 cells by the

eighth month when pregnancy was terminated. Ten days later the blood picture was 60% hemoglobin and 4,200,000 red cells. Such cases, of course, strongly support the idea that the pregnancy produces the anemia by a direct toxic action upon the blood forming organs. Aubertin, who reported 53 cases from Paris clinics says that the pernicious anemia of pregnancy has never been known to clear up without actual emptying of the uterus. However, closely the anemia may resemble the ordinary picture of pernicious anemia, Esch repeats his statement of 1917 that no authentic case of recurrence independent of pregnancy has yet been reported.

The case reported by the writer in 1923 (with a red count of 900,000) has remained in excellent health and has had one normal confinement since that time. Her blood however, as counted on two occasions was slightly below the average count of a normal woman. The latest count on February 9, 1927, showed 4,650,000 red cells, 90% hemoglobin and 5,200 white cells. This case was definitely of the pernicious or primary type. The case reported below is definitely of the secondary type.

CASE REPORT

(Courtesy of Dr. Barney)

Mrs. M. S., age 31, para V, developed pallor and weakness in the latter weeks of pregnancy and presented herself for examination, which showed a hemoglobin 30%, a pulse rate of 120 settling down to 90 with rest. On August 27, 1926, she was transfused with 500 c. c. of the husband's blood (both husband and wife being of Group 4). There was no reaction of any consequence and the patient's general condition was

much improved except for some pain in the right side. On the morning of September 6th, 1½ ounces of castor oil and 10 grain of quinine were administered. The membranes ruptured spontaneously and, rather atypically, considerable bleeding followed. The cervix was dilated to 1 finger, temperature 37, pulse 94, respiration 20, foetal heart 150 to 178. The blood picture at this time, three days after the above transfusion of 500 c. c. of blood was as follows: Hemoglobin 45%; red cells 3,290,000; white cells, 9,000; index .68; Differential: Polymorphs 60%; Large monos 8%; Small monos 28%; Eosinophiles 3%. A Barnes bag was inserted at 7:55 and expelled at 9.27 P. M. Left occipito-anterior position. Delivery at 11.32 by low forceps operation. Pituitrin and ergotol were at once administered. The placenta was expressed but there was some hemorrhage and the uterus was packed to conserve blood. The pulse quickened to 114.

The uterine tape was removed the following day. The lochia remained normal. The temperature continued 37 for four days, then 38 for four days. The baby (2600 grams) was taken off the breast but thrived normally. Convalescence of the mother was satisfactory. On September 22nd, the blood showed hemoglobin 60%, red cells 4,352,000, white cells 11,200. The urine at no time showed more than a trace of albumin and few leucocytes.

The patient made a prompt convalescence and has remained well.

The diagnosis of the anemia of pregnancy is to be made mainly from infection, especially post partum infection and endocarditis including subacute bacterial endocarditis. In the latter leucocytosis, embolic phenomena and petechia are significant. In the pernicious anemias of pregnancy hemonhagic manifestations have been rather unusual. Epistaxis and an occasional purpura or retinal hemorrhage have occurred. Early in pregnancy, the symptoms of the anemia are often disre-

garded as part of the pregnancy. Aubertin states that the diagnosis is usually made late and that of his 53 cases 19 had initial counts of 1,000,000 to 1,500,000 and 3 below 500,000.

The newest phase in the etiology of this condition is the study of the blood groupings of infant and mother. Instead of being in the same groups as usual, they have in a number of instances been found to be in incompatible groups leading to the idea that hemolytic agents from the foetus were responsible for the anemia of the mother. Further statistical data are necessary in this interesting beginning. It can be obtained with very little additional trouble since the blood of the mother is usually typed in preparation for transfusion.

There are no important additions to the treatment of the condition. Transfusion apparently has not been used in Europe as much as in America. Aubertin refers to the subcutaneous injection of 30 to 100 c. c. of citrated

blood as the best treatment. With the present day technique in transfusion it certainly would ordinarily be preferred in America. In the puerperal aplastic anemias in which transfusion has failed one must rely on stimulants of the hematopoietic organs especially arsenic and iron. Clausser reports good results from the slow intravenous injection of colloidal antimony trisulphide in a concentration of 2.53%, stating that 16,000 normoblasts per c. cm. were observed after a single injection.

The important thing is to recognize the condition early so that the patient is not allowed to go into desperate condition. In the case reported a transfusion of 500 c. c. in the eighth month of pregnancy caused no disturbance whatever. The case however was rather mild and of the secondary type. In a severe and progressive case, termination of pregnancy should not be deferred too long because of the danger of collapse at parturition.

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Hemolytic Anemia of Pregnancy with Reports of Cases

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HEMOLYTIC anemia of pregnancy is a specific form of anemia, occurring usually during the latter months of pregnancy, or during the puerperium.

Despite the fact that these women frequently show a definite blood picture, and the clinical manifestations of primary anemia, it would seem that this disease is a specific type of anemia of pregnancy, because if the patient survives the acute attack, the blood picture usually returns to normal, and apparently remains so. This latter fact definitely removes the disease from the heading of primary anemia.

The literature on the subject is not voluminous, and much work remains to be done. This is particularly true as to the etiology.

Very little is known as to the etiology of the subject. Adler (1) believes that there is a predisposition to the disease. This is doubtful in view of the fact that in about all of the cases reported, no previous history of anemia could be obtained, and many of the people have had no recurrences.

Rowland (2) believes that there is produced in the ectodermal cells of the chorion, a synctial hemolysin.

Larrabee (3) reported seventeen cases of anemia occurring in preg-

nancy. Seven of these had the blood picture of secondary anemia, eight had the blood picture of pernicious anemia, one the blood picture and clinical signs of aplastic anemia, and one atypical anemia.

Rowland (2) reported two cases in 1924. Both of these cases gave the true blood pictures and clinical signs of pernicious anemia.

Hoskins (4) reported a case in February of this year. The clinical signs and blood picture in his case were those of pernicious anemia. He believes the condition to be very rare in England, and not uncommon in Northern India.

The diagnosis of the condition is not always easy. The anemia from post partum hemorrhage or the anemia secondary to any obstetrical hemorrhage should not be confused with this condition.

The anemias associated with the toxemias of pregnancy probably present the greatest obstacles to the proper diagnosis of hemolytic anemia of pregnancy. However, blood chemistry determinations, retinal changes, and urinary findings will be helpful in eliminating the toxemias of pregnancy.

Some patients suffering from hemolytic anemia of pregnancy have slight

elevations of temperature, and the possibility of puerperal sepsis must be considered. Subacute bacterial endocarditis (5) with its associated anemia must be ruled out. Blood cultures in both of these conditions will be helpful.

Given a case of progressive anemia, either with the blood picture of primary anemia, or one approaching it, and one which cannot be classed as secondary to any other cause, hemolytic anemia of pregnancy should be borne in mind. If to these facts are added the history of an easy or spontaneous labor with little or no bleeding, the diagnosis should be easily arrived at.

On the whole the outlook in this condition is good. Certainly it is not as bad as the older writers believed it to be. If the patient recovers from the so-called acute or active stage of the disease, the outlook for complete recovery is good. However, there seems to be a difference of opinion as to the possibility of recurrences of the disease with subsequent pregnancies. I believe that there is a very great probability of the disease recurring during subsequent pregnancies, and that this possibility should be given very serious thought by obstetricians. In one of the cases (Mrs. D.), reported below, it seems probable that the illness of 1920 occurring during pregnancy, and following delivery while undiagnosed as such, was hemolytic anemia, and that the attack in 1926 during a subsequent pregnancy was a recurrence.

The treatment until the present time has been transfusion in the severe cases. In the milder cases, many of them will respond to the administra-

tion of iron and arsenic, and the usual methods of treatment of mild anemia.

I am sure that in the future many of these cases will be successfully managed with the Minot and Murphy (5) high nucleo-protein diets. In one of the cases (Mrs. P.), reported below, the patient was placed on a high nucleo-protein diet after leaving the hospital, and the response was very gratifying. It would seem that this plan of treatment should take a prominent place in the management of these cases in the future.

REPORTS OF CASES

Mrs. P. Age-32 yrs. Primipara.

Family History—Father, mother and three sisters living and well.

Past History—Negative.

Patient was delivered by Dr. J. E. Stoddard on January 18th, 1926. Labor was long, and difficult, and forceps were used in delivery. Twelve hours later, patient had slight elevation of temperature. Patient was seen in consultation with Dr. J. E. Stoddard on February 11th, 1926, twenty-four days after delivery. She complained of feeling tired, and of some headache. Face slightly oedematous, mucous membranes pale, pulse rapid. R.B.C. 2,580,000 W.B.C. 8,400 Hb-50%. Polymorphonuclears—56%. Small lymphocytes—40% Large lymphocytes—4% Blood culture negative. Urine—1010, acid, clear, albumin small precipitate, sugar negative, occasional white blood cell. A diagnosis of hemolytic anemia was made, and patient was placed on iron and arsenic.

Subsequent blood counts were as follows: June 10th, 1926, R.B.C. 4,032,000 W.B.C. 8,000 HB. 70-80%. August 12th, 1926, R.B.C. 4,704,000 W.B.C. 4,600 Hb. 75%. Patient was placed on a high nucleo-protein diet. The blood count on September 2nd, 1926, was R.B.C. 5,028,000, W.B.C. 7,800, Hb-75%. November 2nd, 1926, R.B.C. 5,110,000, W.B.C. 7,600, Hb-90%. Reports from the patient since that time are that she is doing well,

and has not had any symptoms of recurrence.

Mrs. D. Age-26 yrs. Multipara.

Family History. Father, mother, brother and sister living and well.

Past History. Influenza in 1918. Patient gave history of kidney trouble during first pregnancy. This occurred in 1920. Following delivery, patient was anemic and this condition cleared up very slowly. Blood count which was done at this hospital, showed R.B.C. 2,400,000, W.B.C. 5,200, Hb-40%. It was believed at that time that patient had an anemia associated with a kidney disease. In all probability this was a true hemolytic anemia of pregnancy.

Patient was delivered on March 6th, 1926 by Dr. I. S. Otis. On March 18th, 1926, when patient was seen in consultation with Dr. Otis, she complained of exhaustion, headache, and ringing in ears. Patient was pale, head oedematous, conjunctivae, tongue, lips, and pharynx pale. There was a soft systolic murmur at the apex, blood pressure 110 over 60, liver and spleen palpable, R.B.C. 1,665,000 W.B.C. 6,600, Hb-40%. A diagnosis of hemolytic anemia of pregnancy was made, and transfusion advised. During this procedure, the needles became obstructed, and the transfusion was very unsatisfactory. On March 21st, 1926 the blood count was, 2,240,000, W.B.C. 6,800, Hb-50%. Polymorphonuclears-66% Small lymphocytes-27%, large lymphocytes-4%, Transitionals-3%. The patient was placed on iron and arsenic, and was discharged on April 10th, 1926. The blood count at this time was 3,300,000, W.B.C. 6,800 Hb-60%. A report since discharge is that she is doing very well.

Mrs. E. M. Age-32 yrs. Multipara.

Patient was seen in consultation with Dr. H. L. Peters, and Dr. H. W. Waterhouse. The patient complained of weakness, ring-

ing in ears, dizziness. She was taken ill on December 12th, 1924 with what was thought to be an influenzal infection. She was in the ninth month of her pregnancy. At that time she complained of weakness, headache, and dizziness. She was afebrile. On January 17 she was delivered of a baby. The labor was short, and with minimum amount of bleeding. Her convalescence was slow.

When examined on February 13th, 1925 she was pale, mucous membranes were pale, there was a systolic murmur at the apex, the liver and spleen were palpable. The Wassermann was negative. The R.B.C. was 1,600,000 W.B.C. 5,200, Hb-33%. There was a change in the size and shape of the red cells.

A diagnosis of hemolytic anemia of pregnancy was made. The patient was transfused, but the response was not marked, and transfusion was repeated one week later. Her condition improved at once.

A blood count which was done on March 14th, 1925 showed R.B.C. 4,100,000 W.B.C. 6,200 Hb-80%. May 19th, 1925, R.B.C. 4,944,000 W.B.C. 6,600 Hb-85%. July 9th, 1925, R.B.C. 5,464,000 W.B.C. 6,200, Hb-95%. February 1st, 1927, R.B.C. 5,318,000 W.B.C. 11,100 Hb-90%.

CONCLUSIONS

1st. Hemolytic anemia is a specific anemia of pregnancy with the blood picture resembling the blood picture of pernicious anemia.

2nd. The condition is likely to recur with succeeding pregnancies.

3rd. High nucleo-protein diets should be given a thorough trial in the management of this disease.

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Early Diagnosis of Gastric Carcinoma*

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THE seat of a large percentage of carcinomata is the stomach. For example, Reiche's Hamburg statistics show that 50.2 percent. of all cancers are gastric (1). The limits of this paper will not permit of a full discussion of the nature of carcinoma. It may be pointed out that the hypothesis of Dr. Guy and Mr. Barnard (2) that cancer is due to an ultra-microscopic, extrinsic virus, requires further confirmation before it can be accepted, since "it has not yet been possible to produce the disease with artificial culture of it." The researches of these investigators, however, aroused intense interest in the etiology of cancer. W. Blair Bell, who has given much attention to the specific character of malignant growths, claims that "malignant neoplasia is a specific growth process in that it is a revision on the part of the starving cell to the nutrient seeking proclivities of its ancestral type, the chorionic epithelium. (3) It may be, however, quite fairly assumed that the essential nature of cancer and its specific cause or causes are still unknown.

There are certain predisposing causes, which are universally recognized and should be kept in remembrance. Welch, who analyzed 2,038

cases of cancer, found that 75 percent. fell in the fourth, fifth and sixth decades of life. About 4 percent. of the cases occurred under the age of 30. This noted author gives the sex relationship as five males to four females.

Opinions are divided as to the influence of heredity. Warthin has stressed the frequency of occurrence of cancer in certain families. As a family disease, carcinoma of the stomach occurs in less than 15 per cent. of the cases. Cancer may develop in ulcer, but just how frequently is uncertain. Statistics vary widely; in the writer's opinion, not more than five per cent. are of this origin. Prolonged irritation due to alcohol or chronic gastritis may act as a predisposing factor. Repeated slight trauma to the epigastrium, as in certain occupations, may rarely be followed by carcinoma of the stomach.

Willy Meyer (4) has well said that clinical efforts should always be directed toward recognizing a precancerous state, and then aborting or excising it, as the case may be, and this applies to carcinoma of the stomach as well as involvement of other organs, although perhaps less directly. Bloodgood (5) states: "Cancer never begins in a healthy spot." Says W. J. Mayo: "No one has yet seen a cancer of the skin or visible mucous mem-

*Read before the Newcastle Medical Society.

brane of the body, which was not preceded by some form of chronic irritation. Investigation of the inner surfaces of the body reveals the same conditions always preceding cancer." It is quite probable that many cases of cancer of the stomach terminate in spontaneous recovery in this preliminary stage, which is occasioned by numerous cancer-inciting factors. The recognition of the precancerous states is here assumed to be an important factor in cancer prevention, since it affords an opportunity to "blight" the disease at its origin. Sokoloff (7) claims the leukocytic reaction may be the causal factor in malignant invasion of the tissues. A connection between this process and an increased polymorphonucleosis, as well as a diminished lymphocytosis is evident.

The early diagnosis of cancer of the stomach is not free from difficulty, although usually possible with those clinicians who will employ modern investigational methods without delay in the presence of any suspicious features. At the commencement of cancer proper, only the mucosa and submucosa are infiltrated, with gradual extension to the peritoneum, hence to wait until a palpable mass, or a localized induration even is detectable to palpation is to permit the opportunity of making an early diagnosis to pass, in most cases, at least. The same is true, if the physician procrastinates until there is marked anemia and loss of flesh and strength. Again, to wait for evidences of dilatation of the stomach with obstructive vomiting, would upon laboratory investigation reveal an advanced lesion.

The situation of the growth is important, since the symptoms vary somewhat with the portion of the stomach affected. According to Patterson (8), the growth is situated at the pylorus in 71 percent. of the cases, in the lesser curvature in 14 percent., and at the cardiac orifice in 5 to 10 percent. Rarely, the wall of the stomach is infiltrated throughout its whole extent.

When symptoms of gastric indigestion tend to persist despite approved treatment, carcinoma should be suspected, if the patient is in the fourth, fifth or sixth decade of life. The onset of gastric symptoms, which will be detailed later, in a person over forty, previously free from such features, together with evidence of impaired motility, and the constant absence of free hydrochloric acid as well as the presence of occult blood persistently and constantly in the stools, would strongly confirm suspicion of this disease.

The gastro-enterologist who habitually employs the stomach-tube recognizes gastric cancer earlier than the general practitioner, so helpful is a systematic examination of the gastric contents, when interpreted with the clinical symptoms. The latter should, however, use this appliance routinely in cases in which the slightest grounds for suspecting carcinoma exist; he should ever keep in remembrance the fact that gastric cancer soon passes beyond the stage in which surgery is effective. A thorough X-ray study, to which reference will be made hereafter at length, should be undertaken quite early. Again, evidence of impairment of the motor functions of the

stomach is an early finding, particularly if the growth is located at or close to the pylorus.

Certain local manifestations set in early, as a rule, *e.g.*, vague discomfort and uneasiness after food, in persons above forty years of age; this is the earliest symptom as a rule, but soon gradual loss of appetite, often with dislike for meats, and nausea, as well as eructation and more rarely epigastric pain, which shows a progressive tendency, appear. The pain may be dull and boring, but sometimes lancinating in character. The onset of pain is often determined by eating. Again, pressure may elicit definite pain in incipient carcinoma of the stomach. The pain may, however, be absent in early cases, and the same is true of all other local features, the picture being composed of the general symptoms only. Such cases are not as a rule recognized until pretty far advanced. Cancer may occur in the course of cases of long standing indigestion, so that such a history should not be allowed to disguise the diagnosis. Vomiting, especially of "coffee grounds" material, emaciation, and secondary anemia occur later, hence do not belong to the stage we are endeavoring to depict.

Cases, however, are met with in which loss of strength and weight with slight anemia were the first symptoms to attract attention. In these instances, the disease may reach an advanced stage before it is suspected on account of the appearance of local symptoms. Such cases have, therefore, usually passed beyond the hope of surgical relief when first recognized. It is to be recollected that cases which

begin by showing gastric symptoms first, also manifest among early features progressive loss of weight and strength, as well as an appreciable increasing degree of anemia.

A palpable tumor is in rare instances compatible with complete extirpation, and in exceptional instances a small palpable mass first directs attention to cancer. In carcinoma of the cardia, the symptoms are ill-defined, but difficult deglutition is often the earliest sign, merging slowly into oesophageal obstruction. Eructations are more common than when other parts of the stomach are the seat of the disease.

I would strongly advise an application of the investigational methods of examination, more particularly the X-ray and fractional analysis of the gastric contents in any case with active or indefinite gastric symptoms lasting one month unabated, and if the patient be in the cancer bearing period of life. Again, if these prove negative at the first thorough examination, they should be repeated at intervals of a couple of weeks.

As pointed out above, occult blood in the feces when constant and persistent, is quite suggestive of gastric carcinoma, and it is often encountered early in the disease. This finding is also met within gastric ulcer, although intermittently, as a rule. A marked decrease in free hydrochloric acid in the gastric contents is one of the earliest signs. Soon it disappears in the vast majority of instances. When present it therefore becomes rapidly less and less.

The fractional test meal extraction as introduced by Rehfuess is to be em-

ployed in these studies, so that the amounts of free hydrochloric acid and total and combined acidity are estimated at fifteen minutes intervals of time until the stomach shows no evidence of food following the ingestion of a test meal. The results of the fractional analysis can be plotted in curves, which may include the amount and nature of the gastric contents and secretion, but as pointed out by Reh-fuss and Hawk (9) "there is no definite curve in gastric cancer or ulcer, or for that matter any of the gastric conditions." Lactic acid is present and butyric acid is also common. In my view, the gastric contents obtained after a test-meal show fairly constant and characteristic findings by the fractional method on chemical examination.

It is well known that notable diminution in the hydrochloric acid also occurs in chronic gastritis, hence this finding must be interpreted with respect to the associated features. Microscopically, yeast fungi and sarcinae are frequently found in the gastric contents and a large non-motile bacillus, the Boas-Oppler, may be recovered therefrom after the disappearance of the free hydrochloric acid, in this disease.

The X-ray is one of the best, if not the best method, for early detection of a cancerous lesion in the stomach wall, which involves the exact determination and localization of the filling defect. The roentgen study may show merely changes in the rhythmic peristaltic waves to suggest pathologic changes in the stomach wall. Not less than 98 per cent. of all cases are recognizable

by means of X-ray according to Dr. Pfahler's statistics, while Taylor and Mallor found the X-ray gave a positive diagnosis in 96.8 percent. of 182 cases. Hurst (10) is of the opinion that a skilled radiographer can show an abnormality of the stomach in 100 percent. of cases of malignant diseases, and he strongly urges that the doctors send their patients early to the radiographer. An early positive diagnosis is rarely possible in cancer of the stomach, without the aid of the X-ray. It is not claimed here that the roentgen study always reveals carcinoma of the stomach, while it is still in the operable age, but it is of the highest value, if interpreted in relation to the clinical symptoms of the case. Whilst the greatest advance in diagnosis lay in thorough and accurate X-ray examination, it would be unwise to rely on the X-ray findings alone. We should not fail to employ the laboratory methods in all suspicious cases, since they are fully justified by most important findings, in some cases, at least. On the other hand, Christian (11) "has the impression that the early diagnosis of cancer of the stomach, in the sense of recognizing it in the stage when it is small locally, and particularly before it has metastasized, is still almost an impossibility, using methods at present available." In his statistical studies few cases of cancer are unexpectedly revealed by X-ray examination in patients whose full histories and systematic general physical examinations are recorded. J. W. Hunter (12), however, regards Christian's view as somewhat immature and thinks furthermore, that there is much to be said

of the negative roentgen diagnosis of cancer of the stomach. In my view Hunter is quite right in assuming that in the great majority of cases a negative diagnosis of carcinoma of the stomach is of value. Again, in my experience, an X-ray after the barium test meal has led to an earlier detection of cancer than would have been possible without this aid. The point I would particularly stress, however, is that the physician cannot afford to neglect a single one of the many bountiful resources at his command.

Peracchia (13) found the Botelho test for cancer positive in 84 per cent. of 172 serums from cancer patients, but only in 7 percent. of 103 patients without malignant disease. He prefers Botelho's simplified second method. The serum is treated with ammonia and nitric acid, after which addition of an iodine-iodid solution causes precipitation. This disappears in normal serum on adding a little more of the solution, but with cancer serum it increases and lasts. Moorehead (14) emphasizes venous thrombosis as a sign of early carcinoma of the stomach and cites four illustrative cases.

If gastric symptoms prove resistant to acceptable, dietetic, hygienic and medicinal measures, in cases in which the roentgen study is inconclusive, an exploratory operation is to be advised for purposes of diagnosis and with the hope that if cancer be present, it will be found to be operable. Whilst gastric carcinoma is usually a primary disease, it may rarely be secondary to involvement of the liver, gall bladder, duodenum, pancreas and intestines, in

which instances the early recognition of the gastric growth is less important since surgical treatment would be of no avail.

DIAGNOSIS

Notwithstanding the frequency of occurrence of cancer of the stomach, out of 2,345 patients who suspected they had cancer, examined by eleven clinics in Detroit, only three cases of stomach cancer were diagnosed positively, presumably for the reason that these examinations could not be complete (15). It will readily be seen from these results that the early recognition of carcinoma of the stomach demands close and thorough study.

In no other gastric affection is a painstaking, searching history of so great importance as in cancer. The precise mode of onset and character of the accompanying symptoms, both local and general, are to be noted in detail. It must be recollected that 75 per cent. of the cases occur between the ages of 40 and 70 years of age. The words of Hale-White are pertinent here: "If symptoms of serious chronic gastric indigestion first appear after the age of 40, organic disease of the stomach should be strongly suspected."

The early symptoms are vague discomfort after food, impaired appetite, eructations, rarely epigastric pain and loss of strength and should suggest cancer of the stomach, and lead quickly to thorough laboratory investigations. Clinical study of the patient, while important, is not the most vital step toward a diagnosis, but accurate laboratory investigations, hence the latter should be instituted early and repeated at brief intervals of time in suspicious

cases. A marked diminution or total absence of free hydrochloric acid and the presence of occult blood in the feces are usually found. Coupled with these findings, impairment of motility and slight anemia, with loss of color and vigor, are noted in early carcinoma. The invaluable help of the X-ray should never be neglected and will confirm the clinical and chemical examination, as a rule. The picture is now highly suspicious and no time should be lost in procuring the services of a competent surgeon.

The history may point to an abrupt onset with active progressive symptoms. Such cases run a more rapid course than the more usual form with gradual, insidious onset, and prompt action is necessary, if they are to reach the surgeon in time for successful resection. Here may be pointed out that Friedenwald and Grove contend that there is present in carcinoma of the gastro-intestinal tract a fairly characteristic curve of sugar tolerance, reaching 0.24 percent. or higher within 45 minutes after the ingestion of dextrose and remaining at this level for at least two hours. Palmer (16) states that the "acid test" which is usually positive in cases of gastric and duodenal ulcer has also been found to be positive in certain cases of gastric cancer, usually in those in which free acid is present and in which the free acidity is a factor in the pain.

EARLY DIAGNOSIS OF CANCER FORMING ON A PREVIOUS ULCER

The appetite lessens, the other local symptoms, especially the gastric pain, becomes increased and is more con-

stant. Its character may change to a more dull, sickening ache, nausea and vomiting are more frequent; occult blood in the feces is more constant and visible bleedings in small amount in the vomitus. The general features, emaciation and weakness, or the cachexia are soon observed to be greater than is present in gastric ulcer. Again, the gastric analysis yields less characteristic findings than in the usual form of cancer of the stomach, especially in the early stage of the case. The hyperacidity of ulcer may persist. An X-ray examination is imperative.

DIFFERENTIAL DIAGNOSIS

The symptoms in the beginning of a case of gastric carcinoma, gastric ulcer, and chronic gastritis are almost identical, and yet it is of the highest importance to know definitely which of the three conditions is present. Painstaking study by employment of modern methods will often detect a localized lesion quite clearly. In such an instance the diagnosis is narrowed to a differential study of ulcer from carcinoma.

The symptoms of chronic gastritis may bear a close resemblance to those presented by the early stage of gastric carcinoma. There is, however, an absence of anemia and emaciation, but no actual localized pain upon pressure in chronic gastritis, merely slight diffuse tenderness. Again, an X-ray examination proves entirely negative, and the contents of the stomach contains free hydrochloric acid, but no lactic or fatty acids after the Boas test meal.

The distinction between gastric carcinoma and gastric ulcer is not always

easily drawn in the incipient or early stages of these affections. It may be noted, however, that cancer occurs in older persons, and unlike ulcer, which is more frequent in females, is more common in males. The pain in gastric carcinoma is but little affected by the ingestion of food and other symptoms of indigestion, especially anorexia, are more marked than in ulcer. The stools give a constant reaction for blood in carcinoma; this is less frequently met with in gastric ulcer. In both ulcer and carcinoma, there may be a palpable mass at the pylorus, but in the former condition, it is only met with in long standing cases, whereas in the latter, it may rarely be detected early.

The temperature in carcinoma of the stomach is usually subnormal, interrupted by intermittent attacks of slight fever, whilst in ulcer the temperature is normal, as a rule. There may be pallor and debility in ulcer, but no cachexia and no peripheral glandular enlargements, which occur in cancer. The absence of free hydrochloric acid is noted in cancer of the stomach, whereas in ulcer there is an excess of hydrochloric acid, as a rule. The duration of cases of ulcer is often exceedingly prolonged, whereas in carcinoma the average duration is less than two years. It must ever be recollected that the X-ray findings should serve to distinguish ulcer from carcinoma of the stomach, even in the earlier stages of these affections, in the great majority of the cases, at least. Unless all of the associated symptoms and signs point collectively to ulcer, an exploratory operation is to be advised.

It is to be recollected that an exploratory investigation can only lead to successful surgical treatment in an early stage of the disease. Rarely, is an exploration done early enough to permit of complete removal of the diseased area of the stomach wall. It might well be asked, is this creditable to the medical profession in view of the fact that extirpation alone offers hope of cure? Cases of gastric cancer first fall under the care of the physician, and should be recognized sufficiently early by him to permit of successful surgical intervention. A really grave responsibility, therefore, rests upon him, and it is a sad commentary upon his diagnostic acumen that only about 15 per cent of the cases reach the surgeon in time to make a satisfactory resection. I feel strongly that it is quite possible to diagnosticate a much larger percentage sufficiently early to be cured, provided that the physician will start a thorough laboratory investigation into the given case upon the appearance of the earliest suspicious features.

The physician has a definite duty to perform to sufferers from dyspepsia with tendency to persist in persons in late middle life, and in failing to meet this obligation, he is guilty of something more than mere neglect, for we must all agree with Sir Berkley Moyinhan, that surgery has outpaced medicine in the treatment of gastric carcinoma.

Lastly, our inability to cure cancer by medicinal and hygienic measures is a tacit acknowledgment of the insufficiency of the healing art, but since surgery is sometimes effective, if re-

sorted to early enough, the whole profession should concentrate on the study of the disease by the newer scientific methods of diagnosis, with a

view to affording the otherwise doomed patient a chance for life through the only avenue known to science.

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The Diagnosis of Operable Carcinoma of the Stomach*

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THE study here reported was undertaken with the object of estimating the relative importance of various criteria in the diagnosis of carcinoma of the stomach. It seemed particularly desirable to assess the value of diagnostic evidence in operable as distinguished from inoperable carcinoma. Our data were obtained from the histories of cases of carcinoma of the stomach diagnosed at the Mayo Clinic from 1920 to 1924 inclusive.

SELECTION OF CASES

Recurrent cases were excluded. In order that we might have some basis for contrast and comparison, the cases in which operation was not performed were classified according to the reasons for such decision, while those in which operation was performed were grouped according to the operative procedure. It will be seen from Table I that the clinician, the roentgenologist and the patient each contributed to the classification. In rejecting cases the clinician was influenced by external evidence of metas-

tasis which precluded the removal of all malignant tissue, rigid fixation of

Table I
 CLASSIFICATION OF CASES 1920-1924

Operation not performed.....	928
1. Rejected by clinician without roentgen-ray examination	110
2. Inoperable by roentgen-ray examination	531
3. Operable by roentgen-ray examination; rejected by clinician	90
4. Operability by roentgen-ray examination doubtful; operation not urged	128
5. Operable by roentgen-ray examination; patient rejected or delayed operation	69
Operation performed	1159
6. Exploration only	432
7. Palliative gastro-enterostomy..	203
8. Resection	524

an epigastric tumor, and in a few instances debility of the patient which rendered the immediate risk of operation prohibitive. In most cases the roentgenologist was responsible for the rejection. By combined fluoroscopic and palpatory examination he demonstrated that the lesion was inaccessible, or that the extent of the infiltration

made resection impossible. In a considerable number of cases, including those in Groups 4 and 5, the patient refused operation. It would be interesting to speculate on the possible reasons for this attitude, but certainly an important one is the opinion of many laymen and certain physicians that carcinoma of the stomach presents a hopeless outlook. The data in Table 1 also show that considerable latitude must be exercised in selecting cases for operation, and this condition must exist until more accurate means are at hand for determining before operation the feasibility of resection, and more especially the presence or absence of internal metastatic lesions and direct extension to contiguous vital structures. On the other hand, unless there is definite evidence that a lesion is not resectable, exploration will always be justifiable if a competent surgeon and surgical facilities are available. There is bound to be an irreducible error of judgment on the part of both clinician and roentgenologist as regards operability.

RELATION TO TREATMENT

In the light of our present knowledge of gastric carcinoma surgery provides the only treatment which merits serious consideration. Any appraisal of end-results necessarily involves a clear distinction between the prognosis in all cases of gastric carcinoma and the prognosis in cases of resectable carcinoma. If we direct our attention to the actual results of surgical treatment, we find that the immediate mortality after skillful resection is not formidable, while the percentage of three-year, five-year, and apparently complete cures is gratifying. The assist-

ance of the internist in the preoperative preparation of patients with dehydration, anemia and toxemia of stasis has materially lessened the immediate mortality of operation. For example, Balfour has reported 120 consecutive resections of the stomach for malignant disease with nine deaths. Because gastric carcinoma occurs most frequently late in life it is permissible to calculate the period of survival in terms of the expectancy of life for the age and sex of the individual patient. In this series the average age of patients was fifty-two years for men and fifty years for women. At fifty-two years the life expectancy for men is twenty years. Moreover, if the patient eventually succumbs to carcinoma, the apparent recurrence may be an expression of predisposition to carcinoma rather than failure of surgical treatment. Finally, the morbidity or degree of actual suffering resulting from deprivation of food and water may be materially lessened by palliative resection or gastro-enterostomy. It is a paradox that many patients who reject surgical treatment in the early and probably curable stages of the disease seek eagerly for the welcome palliation which it may afford in the incurable stage. A malignant neoplasm in the pyloric portion of the stomach is accessible to the surgeon and, if the diagnosis is made early, resection with complete removal of the growth is practicable. It has been estimated that in 75 per cent of cases the lesion is situated primarily in the pyloric region. Since resection was possible in only 25 per cent of cases in the series reviewed here, it follows that approximately half of all patients were denied their only

chance of cure or prolongation of life because of late diagnosis. Failure to recognize gastric carcinoma in the operable stage is the most formidable hindrance to successful treatment. In a proportion of cases early diagnosis is precluded by an insidious onset, rapid growth and a fulminating type, but in this series the average duration of symptoms was approximately eleven months; late recognition must therefore be attributed in the majority of cases to tardy or incomplete examination.

METASTASIS

The distribution of demonstrable metastatic lesions in our series of patients not operated on is shown in Table 2. Peripheral nodules are frequently demonstrable in several situations in the same patient. In this

Table 2

INCIDENCE AND SITE OF METASTASIS IN 928
CASES OF CARCINOMA OF THE STOMACH;
OPERATION NOT PERFORMED

Situation	Definite	Suspicious	Total
Rectal shelf	131	24	155
Liver	112	21	133
Supraclavicular			
lymph nodes	76	11	87
Peritoneum (ascites)	55	6	61
Umbilicus	26	3	29
Chest	9	17	26
Miscellaneous	50	24	74
Total	459	106	565

series 565 definite or suspected metastatic tumors were present in 353 cases in a total of 928. Metastasis occurred in 38 per cent. A careful search for metastasis is an important adjunct to the roentgen-ray examination in estimating operability since no matter what the roentgenogram shows com-

plete removal of all malignant tissue will be impossible if distant growths are present. In case of doubt accessible nodes, such as the supraclavicular, may be submitted to biopsy. In the following case the node proved to be tuberculous and satisfactory resection of a pyloric carcinoma was accomplished later.

Case 1.—A farmer, aged fifty-one years, registered at the Mayo Clinic August 10, 1919. He had been losing strength and weight for seven months and was easily fatigued. He also noticed belching, especially in the morning. Two months later he began to vomit two or three hours after meals. About this time he noticed a small swelling in the right side of the neck which gradually grew larger. This was followed by a dull "rolling" pain in the middle of the epigastrium, which was relieved by vomiting. The pain and vomiting increased in frequency and severity. He was then awakened at midnight or shortly after by epigastric pain. Vomiting no longer brought complete comfort. The pain was sometimes relieved by soda.

A test-meal did not disclose free hydrochloric acid, and 810 c. c. was recovered. The hemoglobin was 48 per cent, and erythrocytes number 4,040,000. The patient had lost 30 pounds in weight. There were visible peristaltic waves in the epigastrium, with a palpable ridge-like tumor lying transversely. The cervical lymph nodes on the right were hard. The roentgenologic report was operable carcinoma of the stomach.

August 23, 1919, a node excised from the right side of the neck was found to be tuberculous. September 14, 1919, partial gastrectomy was performed for carcinoma of the pyloric end of the stomach. The tumor measured 9 by 9 by 2 cm. There was moderate lymphatic involvement and extensive involvement of the serosa.

The age and sex incidence in cases of gastric carcinoma and other surgical causes of dyspepsia are compared in

Figure 1. Although the average age of incidence in cases of carcinoma is higher than in the others, the fact is of little real value in differential diagnosis. On the contrary, the term "cancer age" is relative rather than absolute and may be misleading unless its qualifications are appreciated. The age and sex of a patient may create a suspicion as to the cause of the dys-

time-worn criteria for diagnosis: retention, achlorhydria, palpable tumor, loss of weight, and anemia. Even acknowledging that each of these signs is of value when present singly or in various combinations, one must at the same time be prepared to suspect and recognize operable carcinoma in the absence of most or even all of the signs (Table 3).

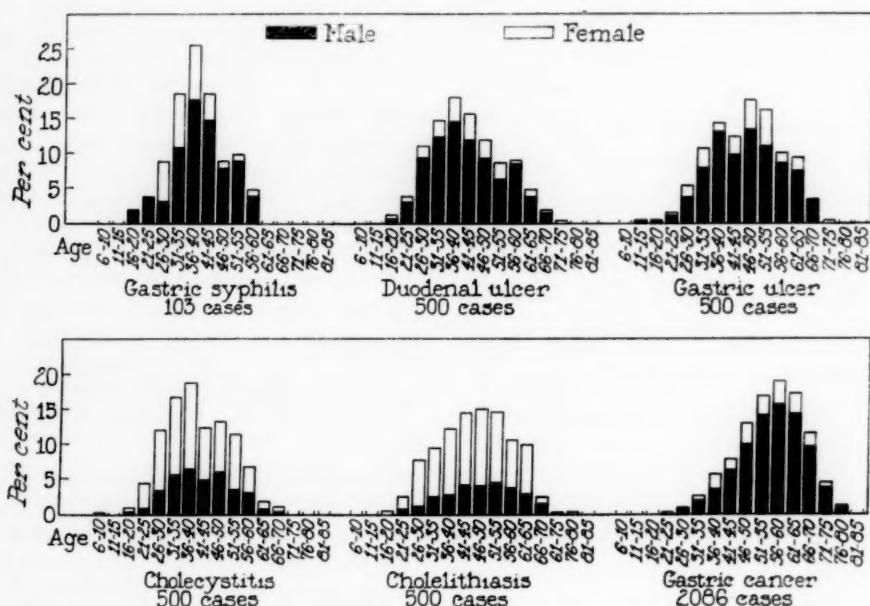


FIG. 2. Anemia in cases of organic dyspepsia.

pepsia, but should not in any sense be relied on for diagnosis. It is at least true that carcinoma of the stomach may be encountered during any age period after twenty years.

VALIDITY OF OLD CRITERIA

Any evidence which may create a justifiable suspicion of carcinoma or have positive value in influencing a decision in an individual case must not be ignored. It is equally important for one to admit the shortcomings of the

Retention.—Gross retention* is not in itself an unfavorable sign since it suggests that the gastric wall above the obstructing tumor is dilatable and,

*The term retention is used to indicate interference with motor function.

The degree of interference may be measured in various ways and for the purposes of this study an arbitrary standard was selected as follows: Early in the morning patients were given a test-meal consisting of 40 gm. of carbohydrate food (arrow root biscuits) and 400 c. c. of water. This meal was given without emptying the stomach of

Table 3
SYMPTOMS AND SIGNS

	Cases	Test-meal		Free hydrochloric acid		Retention		Tumor		Hemoglobin, per cent (Average)		Loss of weight, pounds (Average)		Duration of symptoms (Average)	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Males	Females	Males	Females	Months	
Considered inoperable by clinician without roentgen-ray examination	110	15	13.6	2	13.3	10	66.6	91	82.7	58	56	31	41	9.7	
Inoperable by roentgen-ray examination	531	342	64.4	50	14.6	54	15.5	338	63.7	61	62	29	32	11.7	
Operable by roentgen-ray examination; rejected by clinician	90	60	66.6	20	33.3	26	29.0	66	73.3	60	58	25	33	8.5	
Operability by roentgen-ray examination doubtful; operation not urged	128	85	66.4	14	16.4	31	24.2	91	71.1	60	60	24	33	10.3	
Operable by roentgen-ray examination; patient rejected or delayed operation.	69	56	81.1	18	32.1	28	40.5	36	52.1	62	61	24	28	9.7	
Exploration only..	432	351	81.2	124	35.3	137	31.7	288	66.6	65	66	24	29	8.2	
Palliative gastroenterostomy	203	140	68.9	81	57.8	124	61.0	122	60.1	61	60	29	31	8.9	
Resection	524	477	85.3	239	53.4	240	46.0	259	49.4	67	65	23	24	10.9	

fasting contents, or of any contents remaining over-night. Aspirations were commenced one hour afterward. If free acid was found in the first aspiration the stomach was emptied. If free acid was not found, fractional aspirations were made every fifteen minutes for an hour. At the time of the fourth aspiration, one and three-quarters hours after the test-meal was given, the stomach was emptied. Certain exceptions were made to this rule, as when gross food particles from previous meals were obtained. In such instances the stomach was emptied by using a large stomach tube. It is found in practice

that when this technic is used the total content normally recovered is usually between 100 and 150 c. c. The term retention is used here when the recovered content measured 150 c. c. or more. In fact where retention is recorded the recovered content was usually grossly in excess of this amount. We do not believe that evidence of slight degrees of motor dysfunction, for example an amount of 160 c. c., has diagnostic significance since such an amount may be encountered in such conditions as migraine. In some cases of gastric carcinoma the emptying time is rapid, the amount recovered being less than 100 c. c.

therefore, presumably not infiltrated by the neoplasm. If there is a good deal of healthy wall, resection is more likely to be feasible. Our study, however, shows that gross retention was encountered most often in association with pyloric lesions which, because of local extension to contiguous structures, were not resectable. The advantage accruing from failure of the growth to infiltrate the gastric wall widely was offset by its penetration to organs extrinsic to the stomach.

Anacidity.—In more than half of all cases resectable carcinoma can be recognized when free hydrochloric acid is present in the aspirated gastric contents. The presence of free acid, therefore, is not a good reason for rejecting the possibility of carcinoma. Attempts have been made to utilize, in diagnosis, curves constructed from fractional aspirations, but so far the published results do not convince one that the fractional method furnishes dependable data on which to differentiate intragastric lesions, or that it possesses any advantage over the single aspiration for this purpose. Anacidity and retention are important supplementary factors in diagnosis. The demonstration of gross retention by the use of the stomach tube points to the necessity for a short period of pre-operative preparation to lessen the associated gastritis, to restore muscle tone, and to combat dehydration. The routine test-meal is, therefore, desirable not only to demonstrate anacidity but to secure objective evidence in support of motor dysfunction. If the history reveals recent hematemesis or the patient is extremely weak, the stomach tube should not be used.

Table 3 shows that in 14.7 per cent of the cases in this series that proved to be resectable a test-meal was not considered necessary.

Palpable tumor.—The incidence of palpable tumor is less in resectable than in nonresectable cases. Table 3 shows, however, that a diagnosis may be made in the most advanced cases without palpable tumor, and that the presence of a tumor does not preclude successful resection. Fixation of a tumor which is confined to the left side of the epigastrium usually, but not invariably, indicates that it is inoperable. The roentgenologist's opinion that the lesion is inoperable should support a decision to reject a case for operation. In rare cases this opinion may be overruled, as when a patient is in good condition to withstand an operation and the tumor is mobile to some extent. Successful resection when roentgenologic evidence pointed to inoperability is illustrated by the following case.

Case 2.—A section foreman, aged fifty-three years, registered September 18, 1920. Nine months previously he had noted a sense of soreness in the epigastrium with distention, flatulence, belching, and sour eructations coming on soon after eating and passing away after three or four hours. There had been distress daily since the onset, with increasing discomfort for a month. Sour foods or fruits aggravated the discomfort and the patient was afraid to eat. He had lost 15 pounds in weight.

A fractional test-meal showed anacidity in four fractions. The hemoglobin was 61 per cent, and erythrocytes numbered 3,850,000. There was an irregular, hard, movable mass in the left side of the epigastrium. The roentgenogram showed inoperable carcinoma of the stomach with retention. October 6, 1920 three-fourths of the stomach was re-

sected. The carcinomatous mass measured 11 by 11 by 3 cm. and extended through to the serosa. Lymphatic involvement was not found. February 28, 1927, the patient reported that he was working every day and that his weight was normal.

Free mobility of a tumor in any situation is a favorable sign, although a pyloric tumor may infiltrate adjacent structures through an attachment which permits relatively free movement; such infiltration may preclude resection. From a diagnostic viewpoint the important fact is that gastric carcinoma may exist without palpable tumor. On the other hand, when a palpable epigastric mass is associated with roentgenologic evidence of an intragastric lesion the probability of malignancy is overwhelming. Rare exceptions are encountered, as when a perforating benign ulcer gives rise to a tender inflammatory mass. A still more rare exception is met with in cases of large benign neoplasm. In a case recently observed an intragastric hair-ball gave rise to a large mobile tumor.

Loss of weight.—The actual and relative loss of weight in cases of gastric carcinoma is greater in women than in men. We are unable to demonstrate a consistent relationship between loss of weight and any other single factor, such as anemia, retention, or anacidity. Rapid loss of weight is an unfavorable sign. On the other hand, with an extensive lesion there may not be loss of weight, so maintenance of body weight does not justify exclusion of carcinoma as a possible explanation of persistent dyspepsia. In the following case palpable tumor, anemia, or loss of weight was not present.

Case 3.—A laborer, aged forty-six years, registered January 9, 1924. For fifteen years he had suffered from spells of stomach trouble which lasted from two or three hours to two or three days; at first, intervals of from two weeks to three months occurred between spells, but gradually they lessened and the spells lasted longer. The distress came on at once after eating, as a dull, heavy feeling in the epigastrium, succeeded by vomiting. Usually the vomitus contained some food eaten the previous day. Severe occipital headache occurred and sometimes the attacks were followed by numbness in the fingers and lips. Weight had not been lost.

A fractional test-meal showed free hydrochloric acid 0, 0, 10, and 12. The hemoglobin was 74 per cent, and erythrocytes numbered 4,560,000. A tumor was not palpable. The roentgenograms showed an operable lesion in the posterior wall of the stomach, probably malignant. December 13, 1924, segmental resection of the stomach was performed. The carcinoma measured 3.5 by 3.5 by 1 cm. The lymphatics were not involved. The carcinoma had apparently developed on a polyp.

It seems probable that the loss of weight in cases of gastric carcinoma is proportional to the decreased intake of food. Decreased intake is not always due to lack of appetite, but often results from fear that food may cause distress.

Anemia.—Text-book tradition teaches that anemia in gastric carcinoma may be caused by toxins elaborated by the neoplasm. We are not aware of any proof to the contrary, but are convinced that gross or occult hemorrhage affords a better explanation. Moreover, marked anemia is relatively rare in cases of resectable carcinoma. Figure 2 shows that in 47 per cent of cases of resectable carcinoma the hemoglobin readings fell within normal limits and severe anemia

(less than 50 per cent hemoglobin) was present in only 17 per cent of cases.*

At the Mayo Clinic the stools have not been examined for occult blood as a routine in cases of suspected gastric carcinoma. We cannot, therefore, from experience assess the relative

When the roentgenologist fails to discover an intragastric lesion in a case of suspected gastric carcinoma evidence of gross organic disease in the upper part of the abdomen will often be sufficient to warrant exploration. If such evidence does not exist, a meat-free diet is prescribed, and the stools

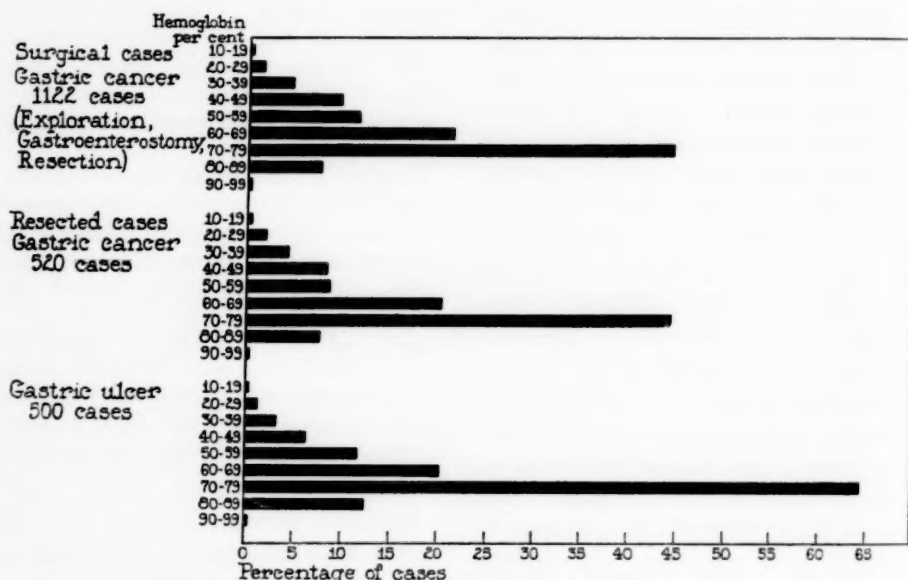


FIG. 1. Age and sex incidence in cases of organic dyspepsia.

diagnostic value of finding occult blood. We believe, however, that the time necessary to carry out this test can be spent to the patient's advantage in more precise diagnostic procedures, especially roentgenologic examination.

*The hemoglobin readings given are those obtained by instruments used as a routine in the clinical laboratories. It has been shown by study that the results obtained with these instruments compare favorably with those from more exact methods when hemoglobin percentages are below 75 per cent; above this range these instruments in our hands fail to show satisfactory graduations. Thus, an average hemoglobin reading in 100 presumably normal subjects was 75 per cent.

are examined for occult blood. If blood is found there is no certainty that it comes from the stomach, or that if it does its source is carcinoma. On the other hand, if blood is not found, carcinoma is not definitely excluded. Gastric carcinoma cannot be precisely diagnosed in any case on the unsupported evidence of occult blood. Supplementary evidence must be furnished, such as the history of dyspepsia, anacidity, or loss of weight and strength, and other sources of bleeding must be excluded. If this supplementary evidence is considered apart from the finding of occult blood, there will

usually not be any question of the advisability of exploration. In any case it has seemed to us that search for occult blood can be conveniently reserved for obscure cases in which the clinical history and physical and roentgenologic examinations are inconclusive.

RELATIVE VALUE OF DIAGNOSTIC AIDS

History.—The history with regard to the onset, course, and character of the dyspepsia may be important in diagnosis but we hesitate to assign it any definite rank or order of precedence because, in our experience, the dyspepsia associated with resectable carcinoma is much more variable, and much more likely to simulate that of other surgical or functional types of dyspepsia than is generally taught. The dyspepsia of carcinoma may descend upon a patient out of a clear sky and run a uniformly persistent and rapidly progressive course. Such an onset is likely to alarm the patient and his physician, and although the diagnosis may be made early in such cases in point of time the fulminating course may have carried the local lesion beyond the point of resectability.

The anatomic situation of a lesion is perhaps of first importance in the production of discomfort. A lesion situated at either orifice of the stomach will produce motor disharmony earlier than one in the body, and in the latter situation it will be earlier manifest if in the so-called gastric canal than if on the greater curvature or posterior wall. As has been intimated, it is a serious mistake to assume that the dyspepsia of carcinoma invariably manifests itself either by a sudden onset or a persistent course. Antecedent or-

ganic or functional dyspepsia does not protect a patient against carcinoma. Thus, the patient known to harbor a diseased gallbladder or appendix, or who is under treatment for anacidity, migraine or peptic ulcer, or who belongs to the group of the constitutionally inferior, whose digestion breaks down under mental or physical strain, is just as deserving of suspicion of carcinoma as the previously healthy patient. Many of the tragedies of gastric carcinoma are directly due to a false sense of security engendered in the mind of the patient or his physician by the presence of chronic dyspepsia. Whether the dyspepsia of carcinoma may in some instances be said to simulate the dyspepsia of peptic ulcer depends on the observer's opinion of what constitutes a peptic-ulcer history. In our experience it is not unusual for a patient with carcinoma to state that epigastric distress comes on two or three hours after the taking of food, that such distress is relieved by soda or by more food, and that he has been free from distress for weeks or months at a time. It might be assumed that such a history would be confined to cases of carcinomatous ulcer, but our study showed that fungating lesions are often characterized by what may be termed an ulcer course. On the other hand, some patients with carcinomatous ulcer fail to show periodicity in the daily sequence of discomfort characteristic of ulcer. In rare instances a benign ulcer may be found in association with a malignant ulcer, as illustrated by the following case.

Case 4.—A bank clerk, aged forty-eight years, registered December 29, 1918. For fifteen years he had suffered from intermit-

tent stomach trouble. Pain occurring when the stomach was empty had been relieved by food and soda. At first the attacks did not occur often. For about a month before admission the pain would come on from two to four hours after a meal; it had also awakened him at night. Food or soda still brought relief. The pain was situated in the right side of the epigastrium and at the tip of the scapula. Two weeks prior to examination vomiting had occurred twice, the vomitus being brownish fluid with coffee-ground sediment. Four weeks before admission there had been an attack of severe pain in the left flank which radiated to the left groin; the abdominal wall became board-like, and morphin was administered. He had lost 6 pounds in weight. At the time of examination there was still a little soreness in the left flank. Tumor was not palpable. A test-meal showed total acidity 68 and free hydrochloric acid 32; 100 c. c. was recovered. Hemoglobin was 75 per cent, and erythrocytes numbered 4,920,000. Roentgen-ray examination showed a large ulcer on the lesser curvature of the stomach. Partial gastrectomy was performed January 7, 1920. A carcinomatous ulcer 2 by 2 cm. was found, commencing 2 cm. from the pylorus on the lesser curvature; there was moderate lymphatic involvement. There was also a benign ulcer 3 cm. in diameter above the carcinomatous ulcer on the lesser curvature.

In an attempt to learn what might reasonably be assumed to be the earliest symptoms or signs of carcinoma, a review was made of the histories of a group of cases with resectable lesions in which the total duration of symptoms was less than two months. These were compared with the first symptoms and signs in cases dating back two years. Strangely enough there was not any appreciable difference in the two groups. In a few cases an epigastric tumor was the first sign noticed. In most cases pain was the premonitory symptom. Vomiting, hematemesis,

and loss of strength and weight followed in order. Cases with an insidious onset of ill health without signs or symptoms referable to the stomach constitute a small but important group which should be differentiated from chronic nephritis and the malignant blood dyscrasias. In most cases there were definite symptoms. What was really lacking was an appreciation of the possible significance of these early manifestations.

Roentgenologic data.—Various authors writing on the diagnosis of carcinoma of the stomach complain of the growing tendency to depend on the roentgenogram. They suggest either by inference or direct statement that the roentgenologic examination is inferior to other clinical methods of diagnosis, and point out that the history, physical examination, test-meal, and stool examination, may serve to establish a diagnosis in cases missed by the roentgenologist. The fear that clinical acuity may be lessened by reliance on precise mechanical methods of diagnosis may be, and often is, unduly stressed, while the gain to the clinician through the use of such means is overlooked. It is true that the value of roentgenology depends on its thoroughness, and on the examiner's skill, keenness of observation, experience and judgment. The roentgenologist may overlook or misinterpret. In Table 4 are compared the roentgenologic evidence of an intragastric lesion in cases in which operation was performed with other data usually considered of value in diagnosis. It will be seen that the chance of demonstrating a lesion by roentgenologic examination is overwhelmingly greater than

the chance of finding a palpable tumor, anacidity, retention, or anemia. The mere portrayal of a lesion is an important step in the elucidation of the character of any type of dyspepsia. The

tation. It is also important to bear in mind that in the cases in which roentgenologic interpretation is difficult the supplementary manifestations are more likely to be absent.

Table 4

INCIDENCE OF OBJECTIVE DIAGNOSTIC DATA

	Exploration only, per cent.	Palliative gastro- enterostomy only, per cent.	Resection, per cent.
Roentgen-ray evidence of lesion	98.8	100.0	98.2
Tumor palpable	66.6	60.1	49.4
Anacidity	64.7	42.2	46.7
Retention (more than 150 c.c.)	31.7	61.0	46.0
Anemia (hemolobin less than 60 per cent).....	27.7	39.2	24.0

Table 5

ROENTGEN-RAY DATA IN CASES IN WHICH OPERATION WAS PERFORMED

	Exploration only	Palliative gastro- enterostomy	Resection
Gastric ulcer; no reference to carcinoma	19	18	46*
Gastric ulcer, probably malignant	3	..	1
Carcinoma, inoperable	124	13	58
Carcinoma, operable, operability doubtful, or operability not mentioned	206	112	285
Lesion	42	32	92
Duodenal ulcer	1	3	7
Miscellaneous	15	4	9
Negative	5	..	9
Roentgen-ray examination not made	17	21	17
Total	432	203	524

*In these cases in which the roentgen-ray appearance was that of ulcer the lesion proved to be a carcinomatous ulcer in twenty cases, and a diagnosis was only possible after microscopic examination in seven of these.

interpretation of the character of the lesion is more difficult and the chances of misinterpretation are greater in resectable than in inoperable carcinoma, but it must not be forgotten that other evidence as well as the roentgenologic must be submitted to judicial interpre-

The roentgenologist's interpretation in the cases of gastric carcinoma in which operation was undertaken is summarized in Table 5. In fifty-five cases out of a total of 1159, the operation was not preceded by roentgenologic examination. In two of these

cases exploration was undertaken for the relief of undifferentiated ascites. In the remaining fifty-three cases the clinical diagnosis was carcinoma of the stomach. In fourteen cases out of 1104 examined (1.3 per cent) operation was advised in spite of a negative roentgenologic examination. In the series of cases of resectable carcinoma, the roentgenologist, although he found an intragastric lesion, was unable to say that it was malignant in 154 of 507 (30 per cent) examined. This seems to be extremely important. To appreciate it fully let us keep in mind that the roentgenologist at least discovered a lesion in these cases. It seems a crucial fact that in the discovery of operable carcinoma, as exemplified by this series, it is necessary to advise exploration in a considerable number of cases in which it is impossible to be sure before operation whether or not the lesion is malignant.

In Table 5 it will be seen that a roentgenologic diagnosis of gastric ulcer was made in forty-six instances in a total of 507 cases which at operation proved to be carcinoma. Pathologically the resected specimens were reported as carcinomatous ulcer in twenty, and as nonulcerating carcinoma in twenty-six. In the group of carcinomatous ulcer the diagnosis of malignancy was possible from the gross appearance in thirteen, while in seven malignancy was detected only after microscopic examination. In one instance, in which the diagnosis was made only after microscopic examination, the patient eventually died from recurrent carcinoma of the stomach.

In the resected specimens, in these

forty-six cases interpreted roentgenologically as gastric ulcer, benign ulcers were found in association with malignant disease in five instances. The association was as follows: carcinomatous ulcer and two benign ulcers in one case; nonulcerating carcinoma and three benign ulcers in one case; carcinomatous ulcer and one benign ulcer in two cases, and carcinoma and one benign ulcer in one case. The occasional association of benign and malignant lesions suggests that a remote history of dyspepsia simulating that of benign ulcer may in a few instances be due to the nonmalignant lesion, while the recent progressive distress may be attributable to the occurrence of carcinoma. It may also explain the roentgenologic reports in a few instances, but a review of the data shows that in twenty-four instances in a series of forty-six cases a nonulcerating carcinoma simulated roentgenologically a benign ulcer. In many of these cases there were suggestive points in the history or in the other laboratory data. If an acidity is present the presumption is warranted that the intragastric lesion seen by the roentgenologist is carcinoma, but it cannot be too strongly emphasized that when the roentgenologist is in doubt the clinician will usually not have information of superior diagnostic worth. In dealing with an undifferentiated intragastric lesion no apology need be offered for advising exploration. If we wait for certain diagnosis we may wait until cure is impossible. If the patient is not to be denied the possible benefits of skillful surgery, carcinoma must be excluded not only as a probability but also as a possibility.

DIFFERENTIAL DIAGNOSIS

Assuming that the patient presents himself for examination and that such examination is comprehensive and thorough, there will seldom be any real difficulty in deciding on appropriate treatment even though accurate differentiation is not always possible. By far the most important step is to determine whether there are roentgenologic signs of an intragastric lesion. An intragastric lesion may be carcinoma, syphilis, benign tumor, simple benign ulcer, or benign ulcer complicated by perforation or perigastric adhesions.

Syphilis.—When the Wassermann reaction of the blood is positive, roentgenologic evidence of an intragastric lesion is more likely to indicate carcinoma than gastric syphilis. That is to say that the incidence of gastric carcinoma in cases of syphilis is greater than the incidence of gross structural change in the stomach due to syphilis. Gastric syphilis occurs in two forms. Usually it infiltrates the walls extensively and produces a dumb-bell shaped deformity, the orifices being free. The symptoms in such cases are characteristically attributable to restriction of the gastric capacity. It is sufficient for our purposes here to say that such cases would be inoperable if they were due to carcinoma, and antisyphilitic treatment may be instituted without prejudice. In the second form, in which a syphilitic lesion, usually a serpiginous ulcer, sometimes a gumma, is confined to the pyloric end of the stomach, differentiation is not easy. A therapeutic test may permit a malignant lesion to grow into the stage of inoperability and it

would seem safer as a rule to advise resection of such a tumor.

Benign tumor.—Benign tumors should be resected in any case, and the only point of interest in attempting differentiation is that a benign tumor situated in the upper third of the stomach may be resectable because its attachment to the gastric wall may be relatively small, whereas a malignant tumor in the same situation would be inoperable because it had infiltrated widely.

Benign ulcer.—The differentiation of benign ulcer and malignant neoplasm is of greater interest because the problem of differentiation will arise more often. It is perhaps desirable to state here that in diagnosis we are not concerned with the academic question of whether benign ulcer degenerates into carcinoma. We are confronted with certain more pertinent facts which, briefly stated, are as follows:

A certain number of cases of carcinoma of the stomach present at the onset and throughout the resectable stage a syndrome so closely paralleling peptic ulcer that differentiation by history or test-meal is impossible. In our series of resectable carcinoma (Table 5), the roentgenologic appearance of the carcinoma was interpreted by experienced roentgenologists as indicating benign ulcer in fifty-three out of 507 cases examined (10 per cent). A complicated benign lesion may simulate a malignant lesion roentgenologically. These facts are set down in the full consciousness that benign gastric ulcer is a definite pathologic entity remaining as a rule, if not always, benign throughout its life history, healing

spontaneously sometimes, producing periodic disability usually, and often becoming complicated by chronic perforation with subsequent deformity from cicatrix or adhesions. If a patient presents himself with a history of several years' standing characteristic of peptic ulcer, if there has not been any change in the degree of discomfort nor in the rhythmic periodicity of attacks, if free acidity is high, and if the roentgenologic examination reveals a small ulcer, it may be concluded with some assurance that the lesion is benign, but it must be borne in mind that there are not any symptoms of benign ulcer of the stomach which may not be simulated singly or in any combination by malignant ulcer. On the other hand, one may frequently feel reasonably sure that a gastric ulcer is malignant, especially if the onset is late in life, if the history is short, if anacidity or hypo-acidity is present, if the symptoms are irregular, and if the roentgen-ray reveals a large lesion. It has been frequently suggested that, when there is any doubt, favorable response to a strict medical regimen for ulcer will indicate that the lesion is not malignant. In our opinion this suggestion is open to stringent objections. First, in many cases of carcinoma of the stomach symptoms have disappeared for weeks or months following such a regimen. This has been true not only in certain cases of carcinomatous ulcer, but also in a few cases of well-localized fungating growth. Second, failure to respond may mean that a benign lesion is complicated by perforation or perigastric adhesions. Finally, it cannot be too strongly emphasized that gastric carcinoma never

sleeps, no matter how silent it may be, and a period of such regimen may permit a resectable lesion to become inoperable. It is surely safer to advise surgical exploration when in doubt, since skillful surgical treatment of benign ulcer is followed by excellent results. A common mistake, contributing to the late diagnosis of gastric carcinoma, is to assume that the early dyspepsia of carcinoma is due to benign peptic ulcer. The following case illustrates an "ulcer history":

Case 5.—A man, aged sixty years, registered January 19, 1920. A stone had been removed from the bladder by suprapubic cystostomy June 30, 1916. In March, 1917, a gnawing pain began in the epigastrium just above the umbilicus; it commenced two hours after meals and was relieved by food. Soda was not tried. Hematemesis had not occurred. About a year before admission there had been bright red blood in the stools. The distress was persistent except for two periods of remission, each of about six weeks' duration. He had vomited several times in June, 1919, and about five weeks before examination he had vomited a large quantity of sour material. Gastric lavage gave relief. At times the pain was severe at the right costal margin. Under treatment consisting of a milk diet, supplemented with alkalis and rest in bed, he had improved. When the diet was later increased to include custard and cereal he stated that he had very little pain. There had been a loss of 14 pounds in weight.

A tumor was not palpable. Following a test-meal, 625 c. c. of gastric contents was recovered which had a coffee-ground residue, total acidity 68, and free hydrochloric acid 54. Hemoglobin was 81 per cent and erythrocytes numbered 4,800,000. Roentgen-ray examination showed a lesion at the pyloric end of the stomach producing obstruction. Operation, January 27, 1920, revealed a carcinomatous ulcer situated on the lesser curvature of the stomach and perforating onto the anterior surface of the pan-

creas. Three-fifths of the stomach was resected. The pathologic report was: carcinoma 4 by 4 cm. involving the serosa; slight lymphatic involvement.

In the following case of carcinoma of the stomach the roentgenologic signs simulated those found in duodenal ulcer.

Case 6.—A housewife, aged forty-seven years, registered September 27, 1920. Three years previously she began to have periodic spells of bloating, belching, and eructation of sour, bitter material, which were relieved by induced vomiting and indigestion of soda; these symptoms were usually worse three hours after meals. There was no actual pain. The spells would last for four or five days and would usually occur during the menstrual period. During the six months before registration the same symptoms recurred almost every day. The patient felt worse at about 4 p. m. Soda still relieved the symptoms, and the next meal would help somewhat in relieving the symptoms. Induced vomiting still gave some relief. Acid foods and fruits made the distress worse. No dietary or medical regimen had been prescribed. There was a loss of weight of 40 pounds.

There was a right inguinal hernia, and a small mobile tumor in the epigastrium. A test-meal showed total acidity 44 and free hydrochloric acid 24; 450 c. c. of rancid, sour material was recovered. The hemoglobin was 55 per cent, and erythrocytes numbered 4,140,000. Roentgen-ray examination of the stomach revealed a deformity which was thought to be a duodenal ulcer causing marked retention. Partial gastrectomy was performed October 8, 1920; the carcinoma was 5 cm. in diameter and was situated at the pyloric end of the stomach. Lymphatic involvement was not found. March 3, 1927, the patient reported a gain of 50 pounds in weight and stated that she was in good health although she was suffering some discomfort from the inguinal hernia.

PROSPECT OF IMPROVEMENT IN DIAGNOSIS

It is interesting to note that the average duration of symptoms in the cases of the group of resectable carcinoma was ten and nine-tenths months. A possible reason for the neglect of symptoms may be deduced from the age and sex distribution. While carcinoma of the stomach occurs over a much wider range of years than the average age might suggest, it is nevertheless true that it begins for the most part during an age period in which discomforts due to involutionary degeneration, focal infection, and so forth, are not only to be expected, but are habitually ignored by the breadwinner who must maintain his place in the competitive struggle for existence.

When, then, are the hindrances to the recognition and treatment of resectable carcinoma of the stomach? The disease may be insidious, and the patient may be unaware of any marked discomfort until the lesion is inoperable. We believe, however, that this possibility is exaggerated in the literature. The patient may have a dread of cancer and conceal his distress until it becomes aggravated. The physician may lack the facilities or training to make a comprehensive examination. The well-equipped physician may misinterpret his observations. With the diagnosis either reasonably established or in doubt, the patient may reject or delay surgical treatment. If gastric carcinoma is to be successfully treated the physician must be constantly suspicious or aware of its possible presence, and to this he must add promptness and thoroughness in examination,

and forceful frankness in urging surgical measures.

In our opinion roentgenology holds first place in the diagnosis of resectable carcinoma of the stomach. By means of the roentgenogram earlier and more useful evidence may be secured than by any or all other means. The roentgenologist's interpretation of this evidence must often be supplemented, or amended, by the clinician. The responsibility for early diagnosis

and advice as to appropriate treatment must be shared by the roentgenologist, physician, and surgeon.

For improvement in the present unfavorable outlook in gastric carcinoma as a whole the public and the profession alike must depend to an increasing extent not so much on the surgeon as on the physician, who has earlier access to the patient and an earlier opportunity to make an examination.

An Unusual Management of Essential Hypertension*

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Report of a Case

ABOUT eight years ago a physician became aware that his customary task of attending to a considerable general practice was gradually growing unbearable. He was about forty-eight years old, five feet eleven inches tall and weighed about two hundred pounds.

Leading a very active life since boyhood he had no complaints or illness for the past twenty years. But, when this history began, he had frequent headaches, dizziness, dyspnoea when hurrying or going up two flights of stairs, became easily fatigued, had casual nosebleeds, suffered from heartburn and other digestive disturbances, was very irritable and felt generally unfit for further work. The pallor in his face and his worn expression were objects of comment by his friends and patients. He then consulted several colleagues with the result that a definite diagnosis of primary or essential hypertension with chronic left ventricular decompensation was made. The presence of a beginning arteriosclerosis was also surmised.

During that time he had applied for a small insurance policy and because

the blood pressure on several examinations proved to be over two hundred systolic, and slightly over ninety diastolic, the policy was refused. On many blood pressure takings since then it remains persistently and uniformly one hundred ninety systolic and ninety diastolic.

He was advised to abandon his work as a general practitioner because in his case the etiological factor of the hypertension were considered to be mental strain, worry and overwork with insufficient rest. The physical strain of stair climbing and attendance to his obstetric practice were deemed the direct causes of his gradual breakdown.

Tobacco was entirely interdicted because he was an incessant smoker of cigars and cigarettes.

A rest cure was also suggested, even absolute rest in bed for a few weeks, in order to lower the blood pressure.

Diet restrictions came next in order. Animal proteins were reduced to a minimum, and caloric intake lessened. Large amounts of all sorts of vegetables were substituted for meat.

Active elimination was strongly urged. Frequent evacuations of the bowels were to be secured daily by salines and vegetable cathartics. Skin

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activity was to be stimulated by sweating. Electric light bath with free ingestion of water during the bath a few times a week were to be very beneficial. Hot packs or daily hot baths were considered next to electric light bath as a substitute.

Restriction of sodium chloride was of course included in the management of case.

The use of coffee was to be given up because of increased irritability.

Unfortunately or rather fortunately he could not follow the regimen thus laid down verbatim.

He was not in a position to give up his practice nor take a rest cure or even rest in bed for a few weeks. His onerous work was only partly reduced. The dietary restrictions, though, he was obliged to comply with because his wife strictly obeyed the doctor's orders and she did the cooking and serving.

Sweating and hot baths were tried casually, but because of frequent "colds" he gave them up. On smoking he compromised by giving up cigars and using only a limited number of cigarettes a day. Drinking of coffee was continued, but in diluted form and diminished amounts.

Ingestion of cold water, even in moderate quantities, resulted in heartburn and was entirely abandoned.

This modified regimen was maintained for several months. But instead of improvement, his condition seemed worse; more dyspnoea, headaches of longer duration, even intermittent claudication appeared occasionally and, in addition, abdominal cramps and dull pains were a frequent occurrence.

He therefore became more worried

and finally decided to apply himself to the subject of hypertension and its sequelae more deeply and see what he can learn in order to help himself. At the same time he prepared himself for a specialty. Thus the burden of his work was increased by added reading and several post-graduate courses in metabolism, cardiography and X-ray.

As a result of special reading on the subject for which he tried to find a check, since a cure was out of the question, the following plan of management was adopted for himself, as well as for his patients in a similar plight.

(1) Work is only restricted to the limits of economic need and psychic satisfaction. All irritating factors surrounding such work or occupation are to be eliminated. Of course, physical overstrain is guarded against. His patients are not told to give up their usual vocations.

(2) Home folks and family are instructed never to assume a negative attitude toward him in conversation or action.

(3) A bulky vegetable diet is strictly eliminated. Those containing a great amount of cellulose, leaving a large residue in the intestines, are forbidden. Only a very small amount of raw and fresh vegetables are allowed as a relish. Legumes, because of the gaseous fermentation which they cause, are also excluded.

(4) A high animal protein diet within caloric needs is adopted. Meat, red or white, twice or even three times a day, well cooked, broiled or roasted, is the dominant food.

(5) To counteract its metabolites with their speculative bad effects, the use of liberal amounts of acid fruits is urged.

(6) While the washing out the natural content of salt from foods is not advised, the addition of salt and the use of very salty dishes is interdicted. Other condiments are permitted.

(7) Coffee in fairly concentrated form is strongly urged to be used instead of water or all other kinds of fluids.

(8) The intake of fats and lipoids are restricted to an unavoidable minimum.

(9) Bread is limited to a minimum and eaten only in the form of dry toast. As it is commonly eaten, though essential in the diet of normals, it is a cause of stasis, hyperacidity, and putrefaction in those affected with cardiovascular disorders.

(10) Sweating, hot and full body baths are forbidden. Cleanliness is maintained by luke-warm showers or hip baths.

(11) Cold showers over head, neck and face every morning are urged.

Other directions which accompany this plan of management of essential hypertension do not differ from those in common use as to rest, amusement and exercise.

The physician who is the subject of this report has benefited by this regimen a good deal and stands presently before you. He is doing more mental and physical work than before and his blood pressure is still one-hundred-ninety systolic and one-hundred diastolic.

He fully realizes that one case is scarcely adequate to change a time hallowed custom of starvation, sweating and purgation in cases of hypertension; nor do the few cases which have been treated in like manner with relatively favorable results enhance the criterion. But the motivation which led into this plan rests on data which seem to deserve a sympathetic consideration and a favorable generalization.

Thus the most outstanding departure from older methods in this plan of treatment is the high protein diet. When first adopted it was to replace the vegetarian foods which gave abdominal discomforts, pain and increased dyspnoea. It was realized that the large fermenting residues left by vegetables were to blame for the increased intra-abdominal tension, intestinal spasm and an added load upon cardiac reserve through pressure on the splanchnic vessels. Meat was chosen to replace them with remarkable relief. The possible harm of its metabolites naturally caused worry, and fruits were used for their "buffer" qualities. These also benefited peristalsis, which was at first sluggish because of the small residue after meat. The beneficent value of small residues in the intestines of hypertensive and arteriosclerotic patients deserves accentuation. It seems to diminish or at least delay the chances of cardiac dilatation, cerebral hemorrhage and angina pectoris, which are the commonest causes of death in these individuals.

Uremia has not been observed in pure hypertension, except perhaps when it has caused arteriosclerosis, involving the kidneys in its progress.

Even then uremia is uncommon. Sclerotic changes in the arterial wall, of hyperpetics are certainly bound to occur sooner or later, but may be delayed and diminished in extent by avoidance of additional strain and pressure on all blood vessels and particularly those within the abdomen. Here we can easily secure lessened strain by foods which do not leave large residues and do not ferment to any considerable extent. Animal proteins as a predominant nutrient seem therefore particularly indicated in these cases.

Recently I found additional encouragement for this point of view in two publications by Samuel A. Goldberg, formerly professor of comparative pathology, Cornell University and pathologist of Ithaca City Hospital. These are reports of "animal autopsies performed in 1913-1924 and a reprint on "arteriosclerosis in domestic animals." Summarizing these in a personal communication Goldberg states as follows:

"You will note that there were seven cases of marked arteriosclerosis in the herbivorous animals out of a total number of 546 and only one in carnivora out of a total number of 817. In the latter it was really a periaortitis definitely due to infection."

Since I am not dealing here with direct results of infection on arteries, there is justification in eliminating even this single case in the carnivorous group. Thus we are furnished with an analogy that compels attention. In a group of over 800 autopsies on the carnivora, no arteriosclerosis was found while in the, by 50% smaller, herbivorous group seven cases were

in evidence. This is plainly suggestive that a nonprotein diet aids the formation of arteriosclerosis or perhaps that meat rather prevents it. It seems to me the more probable conclusion, and if true, there is a further corollary apparent, that a predominant protein diet in cases of hypertension may circumvent the formation of its dreaded sequel arteriosclerosis. Though hypertension may be secondary to arteriosclerosis, such cases, however, form a different variety and are beyond the scope of our present discussion. But even in these cases a high protein diet may be of benefit in checking further progress provided the renal system is yet competent.

The item of salt restriction which figures in my plan of management of primary hypertension cases also calls for some consideration. I noticed that any salty dish or adding of salt to my food at the table invariably resulted in general discomfort, headache and sometimes dizziness. There are, of course, individual differences as to salt tolerance. But in former years I was fond of salted foods and ate them with impunity. I therefore eliminated this condiment from my diet and was agreeably surprised at the wholesome result. Later I tolerated a slight addition of salt in the cooking, but whenever there is an excess of it I am subject to the same disagreeable symptoms which were mentioned above.

With a high protein diet, salt requirements seem to be lessened. When vegetables form the largest item of a diet the need of it seems increased. The Tunguses and Ostiaks, two tribes that live almost entirely on meat, do well without salt. The harm

done by the accumulation of salt in our tissues is generally well known. It favors the formation of edema in cellular tissue and serous cavities.

The reason for the use of liberal amounts of acidulated fruits was mentioned in the outline. Not only may they serve as an efficient antidote to the large meat intake, but through their large content of water readily quench thirst in much smaller amounts than would be required to attain the same purpose with other fluids. It is generally acknowledged that the intake of liquids must be restricted in hypertension and cardiovascular disease.

According to Pascaul water contained in fruit possesses particular properties, radio-active perhaps, analogous to that of mineral waters at springs. Fresh fruit is also laxative, but should be partaken peeled, because the large amount of cellulose in the covering may irritate the stomach and like vegetables prove a burden to the splanchnic vessels, which should be avoided.

Coffee and its alkaloids have a permanent and important place in the treatment of acute circulatory failure. But as a beverage we are often warned against its excessive use lest it produce nervousness, insomnia, functional cardiac disturbances and increased tension. Personally, I never experienced these symptoms even after drinking eight cups per day and one just before retiring. Nor did my hypertensive patients report such symptoms with a smaller use of this beverage. One patient definitely refused this adjuvant as he thought that coffee always made him worse. I then substituted twenty grains of caffeine

benzoate per day in a watery solution for a considerable length of time without any disagreeable symptoms appearing. If we recall that each cup of coffee as usually served contains two grains of caffeine, then twenty grains of caffeine in twenty-four hours are the equivalent of ten cups. Therefore the symptoms which that patient dreaded were purely imaginary.

I wish to point out that the value of coffee in hypertension rests not only on empirical evidence but also on well authenticated experimental data coming from physiological laboratories. Thus C. V. Anrep from the Department of Physiology and Biochemistry, University College, London, and Physiological laboratory, Cambridge, in a report which appeared in the *Physiological Reviews*, Vol. vi, No. 4, of October, 1926, on the Regulation of the Coronary Circulation, states that caffeine produces a lasting increase in the coronary blood flow. This drug was the only one which produced a *lasting* effect. Such fact seems all important when we consider the use of coffee in cardio-vascular disorders. In primary hypertension the safety of our patients lies in a physiological hypertrophy of the heart and perhaps the muscular coats of the arterioles. A lasting increase in the coronary blood flow is the only means of securing this result. Similar effects may be produced through exercise in the general musculature of the body as well as the heart, but in our cardio-vascular patients the therapeutic application of exercise is very limited indeed.

When the usefulness of coffee and its alkaloids is thus established on a

scientific basis, our cardio-vascular patients are ill served by decaffeinated coffees. The picturesque advertising placards which carry the slogan "Use Sanka Coffee and Save Your Heart" form a real menace to them.

Another fallacy in the traditional treatment of essential hypertension and a similar menace is the custom of sweating and the use of hot baths. These invariably depress the circulation through general vascular relaxation. The temporary lowering of blood pressure does not at all compensate for the concomitant result on the heart. The more relaxed the blood vessels become, the slower is the current within. This is a well established fact in hydrodynamics. With the same force behind a column of fluid the latter flows faster through a narrow tube than in a wider one and with less friction against its walls. Vital centers suffer from this slowing of their capillary blood supply and demand increased work by the heart, either through frequency or force, which often results in minor decompensations. Pulmonary congestion and coughs frequently follow hot baths in hypertensive patients. This is usually ascribed to catching "cold." But in my opinion they are evidences of a low grade cardiac decompensation, like the winter coughs of chronic cardiopaths. Such minor insults to the cardiac muscle are usually cumulative and hasten the final result of a grave left ventricular dilatation. It is scarcely realized what extra load on a heart a full hot or very warm bath represents. Besides the relaxation of the vessels, the slowing of the current and the increased friction

within, there is an increase of surface tension on the venous flow, which equals to nearly four pounds per gallon of water. As a full bath contains about thirty gallons this increased tension amounts to one-hundred-twenty pounds, which directly forms an additional burden on the heart muscle.

I therefore advise against bathing in cases of hypertension. Cleanliness is maintained through luke-warm or cold showers of short duration instead. In addition a cold shower over head, neck and face every morning is strongly urged. The revivifying effect of a cold towel or a cold spray over the face and neck in cases of syncope or after anesthesia is well known. It has been claimed that the thoracic ganglia are stimulated thereby. This effect, so beneficial when needed acutely, lends itself well for continued tonic results if used daily.

The elimination of fats or their reduction to an unavoidable minimum in the dietary of hypertensive patients, seems to me advisable because they readily cause intestinal disturbances and are apt to overload the food intake on account of their high caloric value. When the blood plasma becomes overcharged with fats, they also slow the stream of blood cells, thus enhancing thrombosis by blocking the capillary flow.

Besides these empirical observations with reference to fats we know that the earliest beginning of arteriosclerosis shows fatty deposits in the arteries, where also connective tissue cells and wandering cells are found to be loaded with fat. These form the basis for subsequent atheromatous necrosis through deposits of lime

salts and saponification. Thus the avoidance of fats seems sufficiently justified in these cases.

I believe that all the above mentioned provisions in the management of primary hypertension are imperative if the insidious process of arteriosclerotic formation and its sequelae are to be delayed or favorably modified.

In the more advanced stages of this condition they still seem to me applicable in the absence of special contraindications. But in all the phases of this chronic, but surely progressive disorder, we may add many years of comfortable living through the plan which I outlined, though some modification may be called for in certain cases.

It may not be amiss also to accentuate the necessity of guarding these patients against psychic disturbances and irritating environments. The heart seems more vulnerable in hypertension than in any other disease. Working under the strain of the heightened blood pressure, its excitability becomes more acute. The heart's resistance depends on very low excitability.

A heart removed from the body in lower animals survives the longest when it comes from one of lowest excitability. Since left ventricular decompensation is the most frequent result of hypertension, the necessity of guarding this organ against all possible injury, psychic as well as physical is self evident.

While in angina pectoris we all recognize that mental emotion is a most potent cause in bringing on a paroxysm and sometimes death, we

are apt to forget that this is but a cumulative pathological effect of cardio-vascular disease in which hypertension is a frequent factor. Even in the early stages of the latter precordial discomforts are frequent and are more often than not precursors of the advanced paroxysms of angina pectoris. I casually felt them before the adoption of my regimen and could fully sympathize with John Hunter when referring to his attacks of angina pectoris he stated that "his life was in the hands of any rascal who chose to annoy and tease him." Though I was never in such danger my own attacks were sufficiently unpleasant to bear out this classic comparison.

I presented thus far the dietetic and hygienic management of primary hypertension without reference to the lowering of blood pressure and its medication.

There is a disagreement of opinion on the desirability of such a procedure. However, we would all welcome a drug which should bring about a lasting reduction. So far no such medication has been invented. I have tested in my clinic and private patients liver extracts and failed to obtain the results which have been ascribed to them. Temporary reductions sometimes occurred. I have also tried 20% glucose solutions by vein with similar results. The nitrites still hold first place when a blood pressure lowering drug is indicated temporarily.

I have noted, however, that the method which I have outlined, occasionally produces a permanent lowering, though it failed to do so in my own case. But in all instances this plan has resulted in the abolishment

of the most disagreeable symptoms which accompany essential hypertension, such as headache, fatigue, heartburn, precordial distress, intermittent claudication and minor decompensations. The extent to which it may delay or alter the formation of arteriosclerosis cannot be predicted, though I have reason to conclude from data I have quoted, that it will do so considerably.

Myself and those patients who submitted to this regimen can testify to a sense of well-being which was never experienced on a vegetarian diet with periods of starvation, on purgation, sweating and enforced retirement or rest. Such a treatment not only must fail to prolong life, but also kills all desire to live.

The plan which I have adopted and herein describe even though it may not

add years of life to the victim of hypertension, invariably creates a desire to live and enjoy those years which fate has left him.

CONCLUSION

(a) A definite regimen for the management of Essential Hypertension is described, based mainly on a high intake of animal protein and fruits, ingestion of considerable amounts of coffee, avoidance of minor decompensations by the elimination of hot baths with sweating, and the substitution of showers.

'b) Personal experience with this method is related by a physician who is himself a victim of hypertension.

(c) Laboratory and empirical observations are discussed and directed to defend this method.

Late Spring or Summer Hay-Fever in the District of Columbia and Vicinity*

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THESE are three distinct types of seasonal hay-fever in the District of Columbia and vicinity, namely: early spring, due to tree pollens; late spring or summer, the type under consideration; and the fall variety, due to the pollen of the ragweeds. From a careful analysis of the case records of all the seasonal hay-fever patients who consulted me during the past year, I would estimate that in the District of Columbia and vicinity, the late spring or summer cases are about eight times as frequent as the early spring type, but only half as frequent as the fall variety. About one-fourth of the late spring or summer cases are of the combined summer and fall types. About 40 percent of the late spring or summer hay-fever victims develop asthma at some time during the course of the disease, whereas about 50 percent of those with fall hay-fever develop asthma.

ETIOLOGY

The late spring or summer hay-fever season in the District of Columbia and vicinity is from about the tenth or middle of May until the fourth or mid-

dle of July or occasionally the first of August. It is commonly spoken of as "rose cold" or "rose fever," but these are misnomers, as roses are seldom, if ever, the cause. For the pollen of any particular plant to be the cause of true hay-fever it must be floating around in the air in sufficient abundance to be breathed in with normal respiration. In other words, only wind pollinated plants can be held responsible for hay-fever. Clover, daisies, dandelions, honeysuckle, roses, and all other brightly colored flowers with sweet odors are insect pollinated. Even if a person should happen to be sensitive to rose pollen, which is rare, symptoms of hay-fever could be produced only on intimate exposure to roses, and would be more or less transitory.

When I first started to do hay-fever and asthma work, I tested every hay-fever patient with a large number of different pollens, insect as well as wind pollinated. I learned from this that nearly all (about twelve-thirteenths) of the late spring or summer hay-fever patients from the District of Columbia and vicinity were definitely sensitive to the pollens of the following five grasses in varying degrees: sweet vernal (*Anthoxanthum odoratum*), June or Kentucky blue (*Poa pratensis*), orchard (*Dactylis glomerata*),

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FIG. 1.—Sweet vernal grass (*Anthoxanthum odoratum*).



FIG. 2.—June of Kentucky blue grass (*Poa pratensis*).

timothy (*Phleum pratense*), and red top grass (*Agrostis alba* or *palustris*). A relatively small number (about one-sixth) of the late spring or summer hay-fever patients reacted to the pollen of English plantain also known as buckhorn (*Plantago lanceolata*) and a few (about one-tenth) reacted to both plantain and grasses. The five grasses referred to, pollinate successively in the order named, sweet vernal commencing the second week in May, June grass the third week in May, orchard the fourth week in May, timothy and red top the second week in June. The grasses continue to pollinate until about the middle of July. Plantain begins to pollinate about the same time as the grasses and continues until about the first of August. In other words, the period of pollination of the five grasses and plantain coincides exactly with the late spring or summer hay-fever season in the District of Columbia and vicinity. Furthermore, these grasses and plantain grow in great abundance in this locality, and are wind pollinated. Their pollen grains being light and dry, are floating around in the air in large numbers, and under favorable conditions are carried long distances by the wind.

I am convinced that there are a few late spring or summer hay-fever or asthma patients, who are not sensitive to any pollen, food, or animal epidermal, but whose trouble is due to bacteria. This bacterial type of seasonal hay-fever may be differentiated from true pollen hay-fever by the following: definite eye symptoms are usually absent; symptoms are not usually limited to the period of pollination of

grasses or plantain; nasal secretion is more likely to be thick, and yellowish in color; symptoms are usually worse on damp, rainy days; negative cutaneous, intradermal, ophthalmic, intranasal, and hypodermic tests with grasses and plantain. In these patients, proper autogenous vaccine therapy is of course indicated. The method of selecting the organism or organisms to be used, by means of intradermal autogenous vaccine tests, has been dealt with fully in another article (1).

DIAGNOSIS

History. The symptoms of hay-fever are so well known that I need not describe them. The diagnosis of true late spring or summer hay-fever is made partly by the history of the case, which is somewhat as follows: symptoms of hay-fever occurring annually between May tenth and August first, which symptoms are worse on dry, sunny, dusty days than they are on damp, wet, rainy days (rain tending to wash the pollen from the air); worse in the early morning hours, due to the greater amount of pollen in the air at this time; aggravation of symptoms by proximity to tall grass, likewise worse in the country than in the city; definite aggravation of symptoms from a train trip or an automobile ride through the country; relative or complete freedom at the seashore except when there is a land breeze; complete freedom during an ocean voyage. In contrast to the fall or ragweed cases, the patient with late spring or summer hay-fever cannot obtain freedom by going to Europe. As a matter of fact,



FIG. 3.—Orchard Grass (*Dactylis glomerata*).



FIG. 4.—Timothy grass (*Phleum pratense*).

grass hay-fever is the prevalent type in Europe and England.

Skin Tests. The diagnosis of true late spring or summer hay-fever, suspected from the history, is confirmed by means of skin tests, the technic of which has been repeatedly described. I am absolutely opposed to the intracutaneous or intradermal method for routine testing, for a number of reasons, chief among them being: it is somewhat painful, it gives a number of non-specific or false reactions, and it is dangerous (severe constitutional and even fatal reactions have been reported). The cutaneous or scratch (a minute linear incision is preferable to a scratch) method, on the other hand, is practically painless, does not tend to produce non-specific reactions, and is perfectly safe even with the most sensitive patient. The ophthalmic test is less sensitive than the skin test and is seldom employed today. In testing for pollen sensitivity, I have found it more satisfactory to use the pure dry pollen instead of pollen extracts. A small amount of each of the pollens to be tested is applied to a separate scratch on the patient's arm and dissolved with a drop of tenth-normal (0.4 per cent) sodium hydroxide. Of course, when it is desired to determine the degree of sensitivity of a patient to any pollen, it becomes necessary to test the patient with different dilutions of the specific pollen extract.

Other than pollen, every substance (food, animal epidermal, etc.) should be tested, to which the slightest suspicion can be obtained in the course of an exhaustive history.

POLLEN EXTRACTS

When I started to treat hay-fever, I used alcoholic-saline pollen extracts as advocated by Walker (2). After innumerable comparative tests, however, I became converted to glycerine pollen extracts, and am now using them exclusively. The chief point of superiority of the glycerine extracts is their stability. I learned by experience that aqueous or alcoholic-saline pollen extracts rapidly lose their strength, whereas glycerine extracts seem to retain their full potency for at least one year from the date of extraction. Clock (3) was the first to advocate the use of glycerine pollen extracts, his extracting fluid consisting of two-thirds glycerine and one-third saturated salt solution. I personally prefer, as recommended by Armstrong and Harrison (4), to substitute a buffered salt solution (Coca's fluid) for the saturated salt solution, as it is definitely less irritating to the tissues; in fact the individual doses of such an extract (67 per cent glycerine and 33 per cent buffered salt solution) may be injected without further diluting them at the time of injection with distilled water or normal saline. The buffered salt solution may be made by adding 2.7 grams of sodium bicarbonate and 5 grams of sodium chloride to 1,000 c.c. of distilled water. This solution will not stand boiling, and must be sterilized by Berkefeld filtration.

It is desirable to prepare the extracts as concentrated as possible, in order that the very strong doses which are necessary for perfect results, may be administered to patients without injecting large quantities of fluid. As



FIG. 5.—Rep top grass (*Agrostis alba* or *palustris*).



FIG. 6.—English plantain or buckhorn (*Plantago lanceolata*).

far as nitrogen determinations are concerned, it seems that 3 per cent pollen extracts are about as strong as can be prepared, using the glycerine extracting fluid described. By a 3 per cent pollen extract is meant 3 grams of pollen to 100 c.c. of extracting fluid. Noon (5) designated the equivalent of one-millionth of a gram of timothy pollen as one pollen unit. It has since been applied, however, to all types of pollen. In other words, 1 c.c. of a 3 per cent pollen extract would contain 30,000 pollen units or 30 milligrams of pollen. In preparing pollen extracts, it is advisable to add some solid glass beads or agate marbles (depending upon the quantity of extract), not with the idea of macerating the pollen grains which is unnecessary, but to facilitate shaking and prevent clumping, and thus allow the extracting fluid to come into contact with all of the pollen. The extracts are allowed to stand for about a week with frequent, vigorous shaking, then Berkefeld filtered, and examined for sterility. Weaker dilutions are then prepared from this concentrated extract by diluting it 10, 100, and 1,000 times. These dilutions are prepared by taking nine parts of extracting fluid and one part of pollen extract to make the next weaker dilution. For the sake of convenience, I designate these three dilutions and the concentrated extract as A, B, C, and D strength respectively.

A—30 pollen units or 0.03 mgms. of pollen per c.c.

B—300 pollen units or 0.3 mgms. of pollen per c.c.

C—3,000 pollen units or 3.0 mgms. of pollen per c.c.

D—30,000 pollen units or 30.0 mgms. of pollen per c.c.

TREATMENT

It has been maintained by Scheppegrell (6) and others that treatment with timothy pollen extract would suffice for all forms of grass pollen sensitization. I am opposed to this view for several reasons. In the first place, I consider that patients should be treated with an extract of the pollen or pollens that are the cause of their trouble. Now, in the District of Columbia and vicinity, timothy does not pollinate until the second week in June, and yet the grass sensitive patients, as a rule, start to have definite symptoms the second or third week in May. These early symptoms must be due to the early grasses, and therefore I claim they should also be included in the treatment. Furthermore, it is generally agreed that when the extract of a single pollen is to be used for treatment, the dominant reactor should be the one selected. Certainly, in this locality at least, timothy is not always the dominant reactor, as I frequently test patients whose dominant reaction is to any one of the other four grasses already referred to. I therefore consider that the most satisfactory extract for treating grass hay-fever in the District of Columbia and vicinity, consists of equal parts of the five grasses under consideration, namely, sweet vernal, June, orchard, timothy, and red top. Of course, those patients whose hay-fever is due to plantain, are treated with an extract of plantain pollen, and those whose hay-fever is due to both grasses and plantain are treated with

extracts of each simultaneously, one in each arm.

Pre-Seasonal. There are two kinds of treatment, pre-seasonal or preventive, and co-seasonal or treatment given during season. Pre-seasonal treatment started far enough (about two to four months) in advance of season to get the patient as completely desensitized as possible just before pollination of the grasses or plantain, is undoubtedly the ideal method of treating late spring or summer hay-fever. The treatment consists of a series of gradually increasing doses of the specific pollen extract injected subcutaneously in the upper, outer arm. I am of the opinion that the doses can be increased more rapidly by giving them all in the same arm than by alternating the arms. The treatments are given at irregular intervals (from a day to a week apart) depending upon the duration of the local reaction, the general rule being that treatment is not to be given until reaction from preceding dose has entirely disappeared. The individual doses of extract must be measured with extreme accuracy, a tuberculin syringe being necessary for this purpose. The initial dose of pollen extract is usually 3 units (0.1 c.c. of A strength), and each subsequent dose is regulated by the amount of local reaction from the preceding one. In the average patient, the doses can be doubled each time on the weaker dilutions (A, B, and C strengths). Every patient is instructed to carefully inspect his arm about the site of injection at bedtime of the treatment day, and again the following day about 24 hours after the inoculation, to see whether

there is a pink spot on the arm and if so, about how large each time, also to note whether there is any itching or swelling of the arm both times, and to report for another treatment as soon as reaction has completely disappeared. As a rough guide, it may be said that if any individual dose fails to give a satisfactory local reaction (erythema, itching, or swelling, 24 hours after treatment) the next dose may be more than doubled. If positive at bedtime but gone entirely in 24 hours, the next dose may be increased two and one-half times; if no local reaction at any time, the next succeeding dose may be increased three times. If any dose causes a severe local reaction (erythema or swelling extending below the elbow), the same dose should be repeated for the next treatment and then increased less rapidly following that. If a constitutional reaction should follow any treatment, namely, hives, or an attack of hay-fever or asthma, $\frac{1}{2}$ to 1 c.c. of adrenalin chloride 1:1,000 solution should be injected subcutaneously at once, and repeated if necessary. With proper care in regulating the doses, however, constitutional reactions rarely ever occur. Special care must be used when changing from C to D strength, and in fact with all injections of the concentrated extract, where every 0.01 c.c. is equivalent to 300 pollen units. In administering doses of D strength, we must never consider doubling, but should regulate them instead by the amount of increase measured in pollen units or hundredths of a cubic centimeter. For example, if an increase in dose of 300 units fails to give a satisfactory local

reaction, the next dose should be increased by 600 units, and so on; but if any particular increase in dosage gives a satisfactory reaction, then the next dose should be increased by the same amount.

I am convinced that constitutional reactions are due at times to the needle accidentally entering a small vein or capillary, the extract thus being injected directly into the blood stream. When this occurs, the patient develops constitutional symptoms almost instantaneously. As a precaution against this, after the needle is inserted beneath the skin and before the extract is injected, the syringe piston should be withdrawn sufficiently to see an air space between the extract and the rear end of the needle, and if a trace of blood shows in this space, the needle should be withdrawn and inserted in another spot before injecting the extract. All injections should be made slowly. Following the stronger doses, the patients should be kept in the office for awhile, about 15 minutes for C and about one-half hour for D strength. The advantage of keeping the patients in the office is that, if constitutional symptoms begin to develop, such as itching of the palms of the hands or irritation of the throat or nose, adrenalin may be administered without delay, thus checking the reaction or greatly reducing its severity. Furthermore, constitutional reactions are not so likely to occur if the patients remain quiet for awhile, as exercise, especially in hot weather, increases the circulation and therefore causes the pollen extract to be more rapidly absorbed.

The maximum dose of pollen extract

that I seek to attain just before pollen season is from 15,000 to 30,000 pollen units (0.5 to 1 c.c. of the 3 percent extract). Whatever maximum dose is reached just before pollen season, is repeated at weekly intervals throughout the season to keep the patient as completely desensitized as possible.

Co-Seasonal. For those patients who present themselves for treatment just before or during the hay-fever season, co-seasonal treatment with specific pollen extract is clearly indicated. The initial dose of pollen extract is the same in co-seasonal as in pre-seasonal treatment, usually 3 units. In co-seasonal treatment, however, instead of regularly increasing the dose, the smallest dose is given throughout the season that will produce a satisfactory local reaction (erythema at least the size of a dime, 24 hours after treatment), and only increased when it fails to produce such satisfactory reaction. Co-seasonal treatments are given at irregular intervals, from a day to a week apart, depending upon the amount of relief obtained from the individual treatment. Each patient treated co-seasonally is instructed at every treatment that if he receives no benefit from that particular treatment, to report the next day. If relief follows any individual treatment, however, he is instructed not to report for further treatment, until he begins to slip back, or in other words, until the effect of the treatment begins to wear off.

In a previous article (7), I stated that the use of bacterial vaccines seemed to me to be illogical and useless in the co-seasonal treatment of typical

pollen hay-fever, but I have since been forced to modify my views on this point. I find the use of a stock mixed "cold" vaccine containing the common respiratory organisms, in addition to the specific pollen treatment, a valuable aid in the co-seasonal treatment of hay-fever. Scheppegrell (6) and others also recommend the use of bacterial vaccines co-seasonally. It is my opinion that a pollen treatment should never be given while there is any visible reaction from the preceding pollen treatment, although a vaccine treatment may be given at such time in the opposite arm. I give 0.1 c.c. as the initial dose of vaccine. If this gives a satisfactory local reaction, and it is necessary to give additional vaccine treatments, I repeat the same dose. By a satisfactory local reaction from vaccine, I mean a pink spot at least the

size of a dime ($\frac{3}{4}$ inch) visible 48 hours after treatment. The same rule applies to vaccine treatments as to pollen treatments, namely, not to give an injection of vaccine as long as there is any visible reaction from the preceding vaccine treatment. If 0.1 c.c. of vaccine fails to give a satisfactory local reaction, I try 0.2 c.c., etc. In other words, I seek to obtain a satisfactory local reaction from every co-seasonal treatment by giving the smallest dose that will produce such satisfactory reaction.

When the diagnosis is correctly made, and the treatment (pre-seasonal or co-seasonal) properly administered, the results are almost invariably successful, namely, complete or practically complete relief from hay-fever, regardless of the age of the patient, or the duration or severity of the disease.

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The Quest of the Holy Prepuce*

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EVER since the unfortunate escape of all manner of diseases from the mythical box of Pandora, men have, through one means or other, attempted their cure. Whether through the savage incantations of voodooism, or through the various noxious potions used in the middle ages, or through knocking the devil literally and figuratively out of the patients as done by some tribes and even by the Puritans, or by means of the various cure-alls, manipulations, psychotherapy, ecclesiastical and otherwise, or through the spectro-chromotherapy of Ghaduli, or the magic hocus-pocus oscilloclastic box of Abrams, not forgetting the medicated gum drops, chewing gum, etc., men have put forth their claims for treating all of the ills that man is heir to. It was ever thus, and as long as disease is the portion of man, science, near-science, pseudo-science and non-science will battle the common cause, each to register its claims of superiority. Man by nature has always been more or less inconsistent. This claim, I realize, was supposed to be the privilege of woman, but it goes without saying she has her counterpart in man. What man finds good, and to his liking, he naturally approves of; what he questions, may be approved

of later and even adopted. Thus we gain knowledge and the application of knowledge.

At no time was man more zealous of curing the ills he knew little about or more jealous of his contemporaries than in the Middle Ages, when not only were powdered mummy, toads and other appetizing medicaments used for the alleviation of disease, but also the desire for miraculous healing was at the zenith, which prompted the pious and well-meaning clergy to collect, conjure, or cause to be made, relics of departed saints, which were understood to be imbued with supernatural powers for the healing of the sick. Consequently fetish worship became prominent, the popularity of which was nearly as great as that of "Abrams' Oscillator." So great was the demand for various relics that several monasteries and cathedrals, widely separated, claimed to possess the one and only genuine article.

In no case was a relic more venerated than that of the Holy Prepuce.

Circumcision has been practiced by the Jews ever since Abraham and his household of four hundred males were circumcised at Chaldea as a covenant of faith with God. The Mohammedans, who are equally zealous circumcisers, date their practice back to the father of their race, Ishmael, the son of Abraham and his handmaid Hagar,

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who was circumcised by Abraham at the age of thirteen. Yet neither the Jews nor Mohammedans went to the lengths reached by the early Christians, who, strange to say, abolished and repudiated the rite of circumcision, and even persecuted the Jews because of it, yet were inconsistent enough to celebrate its performance with the Feast of Circumcision, and considered its occurrence of sufficient merit to be used as a memorial to excite veneration for the church and promote the pious zeal of the faithful.

Whether or not the quest for relics, so prevalent in Europe in the Middle Ages, was wholly for the purpose of proselyting, or because of medicinal or miraculous value, is a question not satisfactorily answered.

During the 13th and 14th centuries, the Abbey Church of Coulomb, in the diocese of Chartres, France, became possessed in some unknown mysterious manner, of the Holy Prepuce, which it was said possessed the infallible power of rendering all sterile women, who worshipped it, fruitful, and assured easy birth. Naturally such a virtue filled the benevolent monks of the Abbey with a great but pardonable amount of pride. Such virtues are not commonly met, consequently this augmented the numbers of the faithful and added to the reputation and vanity of the monks. Unfortunately for the monks, the popularity of the prepuce became so widespread that they nearly lost their relic.

The good and valiant King Henry V of England and a part of France, was exceedingly desirous that his Queen should have assured an easy birth with the much desired heir.

Naturally, hearing of the efficacy of the Holy Prepuce, he decided to go to Coulomb after it. The unannounced visit of such an august royal personage at the Abbey gates threw the monks into a state of consternation, especially so when his Royal Highness asked for a loan of the prepuce in much the same manner that Mrs. Smith would ask for a loan of a cup of sugar. Refusal was out of the question, and Queen Catherine, of France, feared King Henry as being too powerful to be put off. Inasmuch as evasion did no good and there was no time for duplication, nothing was left for the poor monks to do but reluctantly part company with their prize remunerative possession. When received King Henry caused it to be taken by royal convoy to London, that his waiting Queen might but touch it and insure safe delivery.

Honest Henry fully intended to return the relic immediately after it received the Queen's touch and served its purpose, but, being human, he realized its market possibilities. Therefore, instead of returning it, he caused a royal sanctuary to be built for its repose, where it remained for twenty-five years, regardless of the repeated quests and supplications of the monks for its return to Coulomb. One can imagine the great amount of sterility and maternal distress caused by its absence. There was great rejoicing, however, when, like the prodigal son, it finally came back, and especially so when it was found to possess all of its virtues. Truly the people and clergy had every reason to rejoice, knowing that at least the spectre of fear of a deci-

mated population and maternal agony, had at last been removed.

Even as in our present day life, the genuine is not without its imitations, so it was the case with the Holy Prepuce. Several other places, knowing of its fame and popularity, claimed the honor of having the original prepuce. The Cathedral of Puy in Velay, the Collegiate Church at Antwerp, the Abbey of Our Savior of Charroux, and the Church of St. John Lateran, in Rome, all vied with each other in popularizing it.

The Abbey of Charroux was founded in 788, by Charlemagne, who endowed it with a fragment of the Holy Prepuce. From whence it came is not stated. This Abbey, however, became so popular that indulgences were granted by the papal bull, to all who assisted in the worship of its relics.

During the internecine wars of the 16th century, this Abbey fell into the hands of the godless and heretical Huguenots and the Holy Prepuce disappeared. Since you can not keep a good thing down, when the workmen demolished the walls in 1856 for a new Abbey site, lo and behold! a relic box was found, in which the good bishop found the long lost prepuce, which he carefully placed in charge of the Ursuline Sisterhood, where it was supposed to have remained ever after. Apparently the good bishop of the Church of St. John Lateran in Rome thought differently, for he claimed to have the only authentic Holy Prepuce in his possession. This disappeared during one of the periodical sackings of Rome by the Goths, Vandals and Christians. During the sacking of Rome in 1527, it is related, a soldier

ran away with the holy box. This impious wretch, it is said, came to grief, and some mysterious force compelled him to secrete the box when a short distance from Rome, where it remained for 30 years, when a priest happened to stroll that way and found it. He immediately carried it to the lady on whose domain it was found. On being opened it was found to contain a piece of anatomy of Saint Valentine, the lower jaw of St. Martha, with one tooth intact, and a small package on which the name of the Savior was inscribed. The lady who opened the box stated that a most fragrant odor permeated the atmosphere, also that there was a decided swelling and stiffening of the hand that held the box. Investigation, of course, once more proved it to be the long lost and much sought for prepuce, hence another occasion for rejoicing.

It is said that an inquisitive mind will sometimes cause vexation of the spirit. Such was the case with the pious Canon of the Church of St. John Lateran, who let his curiosity get the better of him and almost caused a well-deserved catastrophe. Being prompted to investigate, he unwisely broke off a piece of the prepuce, when instantly chaos ensued. A terrible tempest broke over the place. Loud peals of thunder and blinding flashes of lightning, with a sudden darkness of Stygian variety, covered the country, voicing the indignation of these perturbed elements, and thereby wrought such a state of fear in the luckless priest and his assistants that all straightway fell down upon their sacerdotal noses fearful of the judgment.

Veiled mysticism has shrouded many an uncertainty, and baffled the material mind for solution, and woe unto the doubting Thomas who failed to accept, without question, that given him by the sanctified clergy of medieval times. What they said was so because they said so, hence the satisfied obedient people accepted the crumbs given them without question, enthralled by the infallible potency of their ecclesiastical custodians. Sacred edifices for worship and healing were built because of some ecclesiastical mandate, made known through man or beast, and heretical was he who as much as questioned the authenticity thereof.

It is related that at one time a sacrilegious soldier robbed one of the churches near Turin, and rode his donkey to this city to dispose of his ill-gotten gain. On arriving there a consecrated wafer ascended out of his plunder and stayed suspended above the soldier unknown to him, thereby attracting the attention of the populace and the good bishop. The donkey, being more imbued with piety than his master, knelt, regardless of his master's blows, until the bishop drew near, when the wafer graciously descended into the bishop's pious hands. Consequently the soldier was immediately hanged for his rash act, and the donkey adopted into the brotherhood. So well behaved and sanctified a beast must naturally be honored, hence the Church of Corpus Christi, in Turin, was erected on the exact spot where the donkey knelt. Moreover, in the center of this edifice was a large flagstone, protected by railing, for the use of the devout.

If, as has been shown, the Holy Prepuce was such an important factor in the consolidation of religious thought, and for the amelioration of mental and physical suffering, one would logically conclude that the instrument for removing the prepuce must also have intrinsic value, therefore should be possessed by some enterprising party. What was needed somehow or other was supplied, hence it was not long after the prepuce popularity was at its height, that the convent of Saint Corneille, in Compiègne, announced the possession of the identical instrument used to perform the Holy Circumcision.

In addition to preputial worship the clergy had taken over the old phallic worship of the Gauls, whether as a means of converting the heathen Gaul, through the adoption of a well established practice, or because of the supposed merit associated with phallic worship, is not clearly understood. Nevertheless, phallic worship was exceedingly popular in the 16th and 17th centuries, largely due to the zeal and enterprise of the clergy.

It is difficult to determine the original source of phallic worship. Several tribes and races practised it, even to the Romans, as shown by the phallic statues found in the ruins of Pompeii and Herculaneum. According to tradition the god Osiris, on returning to Egypt, found that Typhon fomented dissension during his absence. In the conflict which followed, Osiris was slain, and Typhon dismembered his body, which he gave to his followers, but kept the phallus himself. Later Isis, the spouse of Osiris, secured control of the government, and

collected all of the pieces of the dissected Osiris with the exception of the phallus, Typhon having thrown it into the sea. Isis then ordered that statues be constructed, each to contain a piece of the unfortunate Osiris, but for the phallus special worship was ordered. Thus originated the phallic worship, and the sacredness of the white bull Apis of the Egyptians, the bull being chosen to represent Osiris.

One of the first clergymen sent to Christianize Gaul was Bishop Fountin of Lyon, who later became Saint Fountin. So well did priapic worship commingle with his religious teachings, that somehow or other, St. Fountin and old dethroned Priapus became analogous. Finally the former took the place of the latter, and as a result, became immensely popular. He was believed to have exerted wonderful influence in restoring fertility to barren women, as well as vigor and virility to impotent men. So great was his reputation at the Church of Varages, in Providence, that it was customary to make wax models of the flaccid impotent penile appendages of the devoted, and deposit them on the shrine, that once more youthful virility might be restored.

A large phallus, said to be the relic of St. Fountin, was kept in a church at Embrun, where worshippers could obtain miraculous cures for their sterility, by pouring wine over the head of the organ, and catching it underneath in a sacred vessel. Thus the wine was changed into "holy vinegar," a very efficacious remedy for sterility and impotency.

At the time of the Roman occupation of Gaul there was a large priapic

statue near the city of Bourges, at Bourg Dieu, which was greatly venerated. At first the monks and missionaries wanted to remove it, but this caused such commotion with the Gauls, it was thought best to leave well enough alone. Being desirous of cementing the bonds of brotherhood, and not caring to hurt the feelings of the Gauls, the accommodating clergymen transformed it into a Saint—St. Guerluchon—and made a proclamation that scrapings from this statue infused in water would make a miraculous drink that insured conception. Later, several statues of St. Guerluchon appeared in various places, and the clergy competed with each other in increasing the popularity of their particular shrine. At one of these shrines so onerous became the job of replacing a new phallus, that the monks draped the phallus with a cloth, and made it known that mere contemplation of the sacred organ was sufficient.

Not being desirous of being outdone by their well-meaning brethren, the monks in charge of St. Guerluchon's shrine, near the seaport town of Brest, in Brittany, adopted the novel expedient of boring a hole horizontally through the statue, through which the phallus was inserted, so that as fast as it was scraped away in front the industrious monks pushed it forward from the rear, hence not only was there plenty of phallus to go around, but it promulgated the idea of a miraculous growth of this member. Consequently the reputation of this shrine was established, and they continued to do a flourishing business up to the middle of the 18th century.

In relating the foregoing facts there

is no design, or intent, to belittle or criticise, any particular form of worship or question the efficacy or results obtained. It is said many a miraculous cure was made, whether authentic or not remains to be known. However, it is somewhat baffling to know the intricate and devious route sometimes apparently necessary to effect the cure. Curious facts, at times, are gathered in most unlooked for places, and rags may clothe monumental wisdom. It is said that while Benjamin Franklin was going to town, one day, he happened to pass a farmer who implored him to return home, saying it was going to rain. Inasmuch as the sun was shining, Benjamin thought him half witted, and went his way only to be caught in a downpour of rain. Being of an analytical mind, and regardless of his drenched clothing, he returned to ask the rustic the source of his knowledge. The farmer said, "Whenever it is going to rain, your worship, my cow twists her tail in a certain direction, and I saw her twist her tail just before you came." Of a truth wisdom is golden.

The medical practices of the ancient and medieval folk may be excused on

the grounds of ignorance and superstition, which naturally cannot compare with our superior learning and more complete equipment, yet there is no fatter pasture for charlatanism and at no time was quackery more extensively practiced than in the United States at present. The situation must be met in a sense of fairness. It may be unethical and unorthodox to delve into that considered irregular and unscrupulous, but only through getting in actual touch with the situation, and adopting that of proved merit, and exposing the valueless or harmful methods, will the people, now criticised for patronizing quackery, look up to the medical profession as the guardian of public health, as expected of it.

In so doing we may have to agree with Remondino in that "our ethics will need circumcising—and the prepuce of exclusion should be buried in the sands of the desert."

Repeated gloved challenges have been hurled at the medical association from various cults. The all important question is, will they be accepted and acted on, or will the bone of contention remain?

Editorials

The Chemical Regulation of Respiration

THE subject of the control of respiration has given birth to many theories and innumerable investigations. The accumulation of data is great. Repeated experimentation under identical conditions by numerous trained observers has demonstrated the accuracy of various findings. What is lacking is the explanation of these results. Much of the experimental work on the mechanism of respiratory regulation has been planned to test empirical findings, but very little has been carried out to determine the nature of the behavior of nerve tissue. What is needed are basic experiments leading to an explanation of the nature of the institution and conduction of the nerve impulse in nerve and nerve centers. What do we know about the respiratory center; is it automatic or does it function as a reflex center? Is its activity controlled by so-called nervous influences, or by chemical agencies, or by both, and what are the chemical agencies concerned, the hydrogen-ion, carbon dioxide, or oxygen, or unrecognized substances? Is it a concentration of respiratory hormones in the arterial blood that stimulates, or is the metabolism of the respiratory center itself the important factor? What part does the acidity of the blood play, and what is the relation of the latter to the acidity of the interior of the cells of the respiratory center? Is the transport of

acid to or away from the center the controlling factor? What is the relation of the acidity of the blood to the acidity of the interior of the cells of the respiratory center? In what form is carbonic acid carried in the blood, and how across the cell membrane, and what is the significance of the permeability of the cell membrane in the exchange of acid and base between the cell and its environment? What is the significance of the buffer capacity of the cell as well as of the blood? As Gesell has pertinently pointed out, these are the questions that must be answered in the final solution of the problems of respiratory regulation. The views of Haldane and his associates, Winterstein and Hasselbalch, are almost universally accepted today, although the literature shows innumerable exceptions to the principles maintained by them of a correspondence between pulmonary ventilation and the hydrogen-ion concentration of the blood. According to their view the hydrogen-ions of the arterial blood stimulate the respiratory center, thereby controlling its activity, and pulmonary ventilation is so regulated as to maintain a constant hydrogen-ion concentration of the arterial blood. According to Haldane and his co-workers lack of oxygen stimulates respiration by making the respiratory center more sensitive to the ordinary concentrations

of CO_2 . When there is a sudden lowering of oxygen tension, there is an immediate increase in respiration, since the center is more sensitive to the existing CO_2 tension. This sweeps out the CO_2 , and lowers the level of this gas in the blood. When the lower level is reached the increased breathing subsides. This explains why a marked initial hypernea is not seen when the oxygen tension is gradually lowered; there is time for a gradual establishment of a lower CO_2 level. According to this view the respiratory center is controlled by the hydrogen-ion concentration of the blood even during anoxemia, for even under these conditions the breathing changes accordingly, if the alveolar CO_2 be increased or decreased. This theory of anoxemia assumes that lack of oxygen *per se* stimulates the respiratory center by rendering it more susceptible to stimulation by the existing CO_2 tension. It is difficult, however, to explain the continuance of a low alveolar and blood CO_2 for a considerable length of time after the want of oxygen is relieved. In explanation the lactic acid theory has been adduced. In the presence of insufficient oxygen the processes of oxygenation are not completed but stop at intermediary stages, the chief product of improper oxygenation being lactic acid; and it is assumed that in anoxemia sufficient of this acid is set free in the blood to increase the hydrogen-ion concentration, which stimulates the respiratory center and brings about the increased respiration. Briefly expressed the generally accepted view of respiratory regulation is that lack of oxygen causes an increase in respiration which results in the sweeping off of CO_2 with a result-

ant low alveolar CO_2 tension, which in turn produces an alkalosis. The kidneys and liver attempt to compensate for this alkalosis by diminished ammonia and acid excretion and increased alkali output. This compensation, except in slight degrees of anoxemia, is never quite complete, as shown by the continued low CO_2 pressure. While this theory of the hydrogen-ion concentration of the blood as the regulation of respiration is generally accepted in the present day textbooks as a physiological finality, and pathological disturbances of ventilation and respiration are based upon it, a large body of experimental work is contradictory to the assumptions of the hydrogen-ion concentration theory of respiratory regulation. It is impossible to consider this contradictory work in detail, and we can call attention here only to the very important, and perhaps epoch-making work of Gesell and his associates during the last several years. According to the latter there is at present no positive evidence showing any causal relationship of acidity of the arterial blood to pulmonary ventilation. The inverse relationship is more common than the direct. An approximate constancy of the arterial hydrogen-ion concentration is no proof that the hydrogen-ions of the blood regulate respiration; the hydrogen-ion concentration of the blood may be the result of pulmonary ventilation rather than the cause. If acidity of the respiratory center is the important factor, it is more plausible that the diffusion gradients governing acid-base equilibrium are adjusted to maintain a constant hydrogen-ion concentration of the tissues rather than of their environment, the blood. In that event a lack

of correspondence between pulmonary ventilation and acidity of the blood may find an explanation. Since oxygen tension and carbonic acid tension as well as the hydrogen-ion concentration are regarded as constituting the chief respiratory stimulants in the blood controlling pulmonary ventilation Gesell asks this pertinent question, what is the source of the stimulation of the respiratory increase resulting from hemorrhage. It cannot be an increased tension of carbon dioxide of the arterial blood, because that is markedly lowered. There is a similar reduction in HCO_3 ions. It cannot be due to increased lactic acid in the blood because the effect is immediate. It is not arterial hydrogen-ion concentration because this is markedly reduced. Nor can it be the arterial oxygen tension because hemorrhage increases the oxygenation of the blood. It is not the hypothetical "respiratory x" of Haggard and Henderson for the existence of which all evidence is lacking. Hypernea is thus left without a single recognized respiratory stimulant to account for it. However, it was not the association of hypernea with the diminution of every known form of stimulation which forced Gesell to question the prevailing theories of respiratory control, but rather the production of apnea in the absence of any chemical change within the arterial blood. This was demonstrated in experiments carried out by Gesell in association with Capp and Foote in which the hypernea of hemorrhage was transformed into apnea by the acceleration of unchanged blood through the respiratory center. They accepted the prev-

alent view that respiration was controlled by the arterial carbon dioxide or hydrogen-ion concentration as a basis for studying the effect of hemorrhage and subsequent injection of gum-saline solution on the volume-flow of blood. They reasoned that if hemorrhage decreases the volume-flow of blood, and if the formation of carbon dioxide in the body continues at the normal rate, the blood should return surcharged with carbon dioxide and free hydrogen-ions which on reaching the respiratory center would stimulate respiration. They reasoned further that if the injection of gum-saline solution accelerated the volume-flow of blood out of proportion to the dilution of the blood the nutrient flow would be increased. The carbon dioxide carriers would circulate at a more rapid rate and consequently would be more lightly laden with carbon dioxide; the hydrogen-ions of the blood reaching the respiratory center would be diminished and respiration would be correspondingly depressed. But the immediate cessation of respiration on the acceleration of unchanged blood, that is, blood which had already left the tissues, forced the conclusion that the metabolism of the respiratory center and transport of acid from the center are the primary factors in the control of respiration. The theory developed by Gesell from these observations is essentially as follows: The respiratory center possesses an acid metabolism of its own. The rate of formation of acid in the center and the rate of transport from the center determine the acidity of the center. Changes in the hydrogen-ion concentration of the respiratory center rather than the blood constitute the

prime factor in respiratory control. Since the supply of oxygen determines the absolute and relative amounts of lactic acid and carbon dioxide found in living tissues, and since it controls the efficiency of transport and elimination of acid, it constitutes the normal and indirect regulator of pulmonary ventilation. The effects of lactic and carbonic acid are additive. They are exerted indirectly by way of the blood from the tissues, and more directly through their formation in the respiratory center itself. Diminished oxidation in the respiratory center leads to an accumulation there of the relatively poorly diffusible lactic acid in a relatively poorly buffered cytoplasm and lymph, no longer fully protected by the potential alkalinity of the blood—the dual function being disturbed by the diminution in the reduction of hemoglobin and the liberation of alkali as it passes through the center. By virtue of its own metabolism and its extreme sensitivity to minute changes in its own hydrogen-ion concentration the respiratory center is sensitive to minute changes in its own oxidations, and therefore, to changes in the oxygen tension of the arterial blood. The capacity of the center to respond to changes in the arterial carbon-dioxide tension, consequent on fluctuations in the general metabolism, however, must also be a factor. Gesell does not claim that the reaction of the tissues of the respiratory center itself as the true stimulus of respiration solves all of the problems of the mechanism of respiration and ventilation. In its ultimate analysis the regulation of respiration may be found to be an electrical phenomenon occurring with the aid of a

surface membrane and changes in composition of the fluids on both sides of that membrane. Whether acid is the only agent which can produce the necessary electrical disturbance involved in the nerve impulses is highly improbable; on the other hand, it may be the agent most employed in the body. The reception of Gesell's theory of the regulation of respiration has naturally been antagonistic in part. Roberts re-investigating the effects of hemorrhage on respiration states that "the fact brought out that pulmonary ventilation does not vary inversely with the blood pressure completely negatives Gesell's assertion and shows that his theory is without experimental foundation." On the other hand, Schneider, Truesdell and Clarke believe that "this theory provides the best explanation for the respiratory variations of the type of anoxemia we have studied." Confirmation of the accuracy of Gesell's theory remains to be furnished by other investigators, and because of the great importance of the problem it is desirable that workers in the field of respiration and ventilation concern themselves with investigations bearing upon this question.

ENTERIC FEVER SITUATION IN THE WORLD*

The following report on enteric fever in the world is taken from the September 15 issue of the Monthly Epidemiological Report of the Health Section of the League of Nations Secretariat.

*From League of Nations Non-Partisan Association, 6 East 39th Street, New York City.

The enteric fever situation was on the whole favorable in July in most European countries. In England the incidence decreased toward the end of July, while fewer cases than usual were reported in July in Denmark, Norway, Sweden and Finland. In England and Wales, there were 321 cases during the four weeks ended August 20, as compared with 406 cases during the previous four weeks, although the incidence ordinarily increases markedly at this time of the year. In Germany, fewer cases were reported in July and early August than during the corresponding months of any previous year. It is to be noted in this connection that exceptionally cool and wet weather prevailed over the northern part of Europe in June and early in July.

Further south in Europe the incidence may be characterized as normal, except in Italy, where it was above normal (2,100 cases during the four weeks ended July 3, as against 1,274 cases during the corresponding period of the previous year). In the Serb-Croat-Slovene Kingdom, the incidence was also higher than last year and there was an outbreak at Belgrade, where 48 cases were reported during the first week of August; it seems to have been promptly controlled, as there were only 10 cases the following week. The crest of the seasonal curve for enteric fever is not reached until September or October, but its low prevalence in summer in many countries is probably of good augury for the autumn.

In the United States, 3,878 cases were reported during the four weeks ended July 30, as compared with 3,493

cases during the corresponding period of 1926.

In Canada, the enteric fever situation is entirely dominated by the formidable epidemic at Montreal. This epidemic, which appeared to be coming to an end in the latter half of April, broke out afresh early in May. There were nearly as many cases in the second wave as in the first. A recrudescence of this magnitude is a most unusual phenomenon.

From the beginning of the epidemic and up to July 9, 4,849 cases were reported and 489 deaths were ascribed to typhoid fever. Notifications numbered 2,604 in March and April, which may roughly be taken to correspond with the first wave, and 2,242 in the second wave between May 1 and July 9. If the deaths reported up to May 7 are taken as corresponding to the first wave, there were 251 deaths during the first and 234 during the second wave. Deaths due to the first wave occurring after May 7 will probably be approximately compensated by those who may have died after July 9, returns for which have not as yet been received. This would give a case mortality rate of 9.6 per cent in the first and 10.4 per cent in the second wave.

The circumstances which produced the second wave were evidently already in operation in the latter half of April, when the notifications showed only the tail-end of the first wave. It may be noted in this connection, that, in 1926, there were 256 deaths from typhoid fever in the Province of Quebec (203 in the remainder of Canada), and that only 271 typhoid cases were reported.

It is confirmed that the origin of the

epidemic was due to milk-borne infection.

The proportion of hospitalized patients is a little over 33 per cent of the total. Convalescents are discharged when two examinations of feces and of urine made at intervals of not less than three days have given negative results.

A high proportion of the cases were among children; 35.5 per cent of the cases for which the age is stated were under 10 years of age and 32.2 per cent between 10 and 20 years.

Mortality statistics are on the whole more complete than morbidity statistics and are therefore more readily comparable for different countries—at any rate, for diseases in case of which the diagnosis does not present too great difficulties. As statistics of causes of death for 1926 are so far available only for a few countries, the enteric fever death rates for 1925 and 1926 are given below for groups of large towns.

	Population in Thousands	Rate per Deaths 100,000			
		1925	1926	1925	1926
107 English towns	19,411	183	140	0.9	0.7
16 Scottish towns	2,396	24	23	1.0	1.0
3 Scandinavian towns	1,300	11	11	0.8	0.8
48 Germany towns	17,024	336	483	2.0	2.8
47 German towns*	16,597	330	223	2.0	1.3
14 Dutch towns	2,411	57	44	2.4	1.8
30 Swiss towns	1,184	16	13	1.4	1.1
2 Belgian towns	1,126	39	22	3.5	2.0
5 French towns	3,932	222	214	5.6	5.4
7 Italian towns	3,447	483	646	14.0	18.7
49 Spanish towns	4,263	890	1,081	20.9	25.4
4 Czechoslovakian towns	1,176	97	84	8.2	7.1
4 Polish towns	1,995	256	308	12.8	15.4
79 Ukrainian towns	3,460	443	528	12.8	15.3
2 towns of the U. S. S. R.	3,632	463	409	12.7	11.3
2 Egyptian towns	1,351	445	438	32.9	32.4
21 Japanese towns	8,741	...	2,325	...	26.3
4 Indian towns	3,128	909	1,057	29.1	33.8
59 towns of the United States	29,621	993	822	3.4	2.8

*Without Hanover.

It is seen that in Europe the incidence of enteric fever in general increases from north to south; in England and in the Scandinavian countries, the mortality is of less than 1 per 100,000 inhabitants; in German, Dutch and Swiss towns it is mostly between 1 and 2 per 100,000, exception made of the explosive outbreak at Hanover, when the death rate rose to 60.9 in 1926. In southern and eastern Europe the death rates from enteric fever are mostly between 10 and 20 per 100,000; in certain Spanish and Italian towns they exceeded 30. At Athens the rate was 39.3 and at Salonica 44.1 in 1924.

The mortality in European towns was on the whole lower in 1926 than in 1925, with exception of Spanish, Italian, Polish and Ukrainian towns, where the rates were higher.

Similarly in the United States, the mortality from enteric fever is mostly below 2 per 100,000 in the northern towns, but exceeds 10 in most towns of the South. It was on the average lower in 1926 than in 1925.

Mortality in 1926 in Large Towns of the United States Grouped According to Geographical Divisions

	Population in thousands	Deaths	Rate per 100,000
New England	2,522	38	1.5
Middle Atlantic	11,399	241	2.1
South Atlantic	2,226	120	5.4
North Central	10,596	192	1.8
South Central	2,314	294	12.7
Rocky Mountain and Pacific	3,431	68	2.0

In sub-tropical and tropical countries, enteric fever is even more prevalent than in Southern Europe or in the Southern States of the United States. The mortality per 100,000 inhabitants in 1926 was thus: 38.9 in Cairo, 82.4

in Teheran, 68.9 in Calcutta, 29.1 in Singapore, 35.9 in Batavia and 29.1 in Manila. It is probable that in several of these towns the certification of causes of death is less accurate than in European towns and the rates may therefore in some instances be too low.

In South America, the incidence of enteric fever is lowest in the southern temperate climates and generally increases northward. The death rate from this cause per 100,000 was in 1926: 4.4 at Buenos Aires, 14.2 at Montevideo, 41.4 at Sao Paulo, 8.5 at Rio de Janeiro (low for the latitude), 33.7 at Lima and 92.8 at Bogota.

Mortality statistics for 1926 are available for the countries shown below; the rates do not differ greatly from those given above for large towns in the same countries.

Mortality from Enteric Fever in Various Countries in 1926.

	(Population in thousands)	Deaths	Rate per 100,000
England and Wales	39,067	367	0.9
Scotland	4,903	39	0.8
The Netherlands	7,449	137	1.8
Switzerland	3,959	59	1.5
Germany	62,612	1,102	1.8
Czechoslovakia	14,353	1,183	8.2
Spain	22,128	4,747	21.5
Canada	9,291	461	5.0

Abstracts

Primary Sclerosis of the Pulmonary Artery and Its Branches. By C. M. BACON and C. W. APFELBACH. (*Archives of Pathol. and Lab. Med.*, May, 1927).

Primary sclerosis of the pulmonary artery and Ayerza's disease are two clinical entities which have been studied with increasing frequency during recent years. Even though diminution of the pulmonary bed by sclerosis of the pulmonary artery and its branches is the essential morbid alteration in both diseases the clinical manifestations, as described, are in many respects dissimilar. Most authors describe syphilitic arteritis of the pulmonary artery in Ayerza's disease, whereas in the other disease syphilis has been excluded and another single common etiologic factor has not been found. Primary sclerosis of the pulmonary artery and its branches has been described by Eppinger and Wagner, Posselt, Schutte, Miller, Liebig, Meyer and Lowenstein. The notable clinical features of this condition have been cyanosis, hypertrophy of the right ventricle, small left auricle, absence of evidence of passive hyperemia of the lungs and disproportion between the cyanosis and dyspnea. The disease is one of early life or early middle age. Death usually results from cardiac decompensation. The pulmonary arteries show more or less marked atherosclerosis, while the arterioles show usually a high degree of stenosing fibrosis. In Ayerza's dis-

ease the clinical symptoms are similar, but more marked, and include polycythemia, marked cyanosis, with hypertrophy and dilatation of the right heart. Attacks of intense dyspnea occur, giving rise to the clinical appellation of "cardiacos negros." This disease was first described in South America by Ayerza in 1901, and later by Arrillaga, and Escudero. The first American case was reported by Warthin in 1919. In these cases syphilitic sclerosis of the pulmonary artery and branches was the primary underlying pathology. While Warthin's case showed a syphilis of the pulmonary arterial system, he also states that a similar clinical picture might be brought by chronic pulmonary vascular disease due to other etiological factors than syphilis. The case reported by Bacon and Apfelbach presented the picture of chronic cyanosis for four years with hypertrophy of the right ventricle. The cyanosis was never as severe as in Ayerza's disease. The case, that of a woman, forty years of age, had been regarded as one of mitral stenosis. There was no emphysema, the left auricle was not enlarged. The development of the disease was insidious, following a severe pulmonary infection at the age of 32. There was no congenital heart disease. In the earlier stages of the disease there was a mild secondary anemia, in the later stages a polycythemia of six million red cells. Evidence of myocardial in-

sufficiency did not become conspicuous until eight months before death. Edema of the subcutaneous tissues appeared at that time. The autopsy showed: sclerosis of the pulmonary artery and branches; hypertrophy of wall of right ventricle; edema of myocardium; fibrous obliteration of pericardial sac; marked general hyperemia; slight ascites; edema of retroperitoneal tissues, gastro-hepatic ligament and wall of gall bladder; indurative shortening of the mesentery and mesocolon; moderate emaciation; slight generalized jaundice; cyanotic atrophy of the liver; atrophic emphysema of lungs; apical scars; localized bilateral fibroid pleuritis; localized perisplenitis and perihepatitis; moderate atherosclerosis of aorta; slight anthracosis of lungs and bronchial nodes; slight canities; ovarian cysts; bilateral hydrosalpinx; corset liver. Microscopically the changes in the pulmonary arteries were those of an intimal and subintimal fibrosis constricting the lumen, more marked in the case of the arterioles than in the larger arteries. Organized thrombi were found in some of the vessels. No evidences of syphilis were seen. There were no round-cell infiltrations in the vessel walls or around them. The authors regard this case as corresponding clinically with those described by Posselt and Eppinger. The cyanosis was never as marked as in Ayerza's disease and there was no marked enlargement of the spleen. Polycythemia was of a moderate degree. The possible etiologic factor in this case was the attack of influenza and pneumonia at the age of thirty-two. The authors conclude with the statement that they believe this case to be typical of pri-

mary sclerosis of the pulmonary artery, which they differentiate from Ayerza's disease.

Pruritus Ani and Pruritus Vulvae of Fungal Origin. By ALDO CASTELLANI (New Orleans Medical and Surgical Journal, March, 1927, p. 625).

Pruritus ani and vulvae are two of the most annoying and obstinate conditions with which the general practitioner comes into contact, and his therapeutic attempts are usually unsuccessful. That some of the forms of this affection are fungal in origin is not generally known, as there is no description of it given in the textbooks, although this form was described by Castellani as a separate entity some years ago. The patient complains of a very severe pruritus, not as a rule continuous, but at intervals. It is often worse at night, but attacks of unbearable itching may come on at any time. The inspection of the affected region in recent cases may reveal nothing at all, except signs of scratching; but in most cases on careful examination, minute red, slightly raised, infiltrated patches may be seen in the perianal region, occasionally arranged into two curved lines. In a number of old cases signs of dry or moist eczematous dermatitis are present, and streptococcus and other secondary bacterial infections may become engrafted on the mycotic condition. In some old-standing cases the skin is thickened, lichenified, and even presents the picture of the old so-called eczema ani chronicum. When the secondary bacterial infection becomes very heavy, especially if many colon and proteus bacilli are present,

the fungus may disappear or become extremely scarce. Illustrative cases are given. The cause has generally been found to be the presence of fungi of the genus *Epidermophyton*, the same fungi that produce ordinary tinea cruris, dhobie itch, tinea inguinalis, epidermophytosis inguinalis and pruritus interdigitalis pedum. Occasionally fungi of the genus *trichophyton* may be present. The species of epidermophyton found have been *E. cruris* and *E. rubrum*. Yeast-like fungi are also often present but it is doubtful if these play any important etiological role. The characteristics of these organisms are then described in full. The diagnosis depends upon the demonstration of the presence of the organism, either microscopically or culturally. A diagnosis of probability can often be made on clinical grounds alone, from the presence of the minute, red infiltrated patches, especially if the patient has a mycotic dermatitis of the toes, or gives a history of having suffered from dhobie itch or tinea cruris in the past. When a rich bacterial culture is also present it may be very difficult or impossible to isolate the fungus. The course of the condition is chronic, but periods of great improvement and apparent cure may alternate with periods of severe recrudescence. In certain very highly strung, nervous patients the pruritus may continue after the disappearance of the fungus. Very difficult are the cases of true eczema in which a secondary infection with the epidermophyton fungus has occurred. The diagnosis can usually be made by the microscopic examination of scrapings from the affected surface, macerated on a slide, in a 3 per cent solution of

potassium hydroxide. The preparation should be carefully covered with a cover glass, and examined with a medium high power. Fragments of mycelia and spore-like bodies will determine the diagnosis. Castellani has found an ointment of sulphur. praec. gr. 30, acid salicyl. gr. 30, vaseline 1 oz., very efficacious. Also Deek's ointment, salicyl. acid 4 parts, bismuth subnit. 10 parts, mercury salicylate 4 parts, oil of eucalyptus 4 parts, with vaseline and lanoline to make 100 parts, frequently works very well. Diluted tincture of iodine is at times useful; also a strong lotion of potassium permanganate (15 gr. to 1 dr., to 1 oz. distilled water). Frequent swabbing of the ano-perianal region with a perchloride of mercury lotion (1:1000) or a resorcin lotion (1-5 per cent) may be used. When the pruritus is unbearable painting the parts with a lotion of arg. nitro. 15 gr., spir. aether. nitr. 1 oz. may stop the itching at once, or after a short period of intensification. Treatment of the vulvar pruritus is essentially along the same lines.

A Study of the Accessory Pancreas, With Report of One Causing Pyloric Stenosis. By KELLEY HALE (Annals of Surgery, June, 1926).

The literature of accessory pancreas up to date is analyzed and a new case reported. This is of clinical importance in that it was associated with pyloric stenosis in an infant six weeks old, dying from hemorrhage after operation. The author comments on his case, as follows: An aberrant pancreas was found 4 mm. from the lumen of the pylorus with no evidence of ducts. The pathological and clinical

findings conformed in every detail with those of congenital pyloric stenosis. Many writers agree that pancreatic secretion can produce chemical irritation. The writer believes that the activity of the cells of the aberrant pancreas described before irritated the musculature of the pylorus in this infant to such an extent as to produce pathological changes. He does not think that congenital pyloric stenosis is the result of spasm; but like most functional disturbances will probably show a direct underlying cause, and he regards the aberrant pancreas in his case as the cause. He does not believe that the occurrence of aberrant pancreas and typical pyloric stenosis is purely coincidental, and would suggest that any pylorus removed at autopsy showing congenital stenosis should be cut in serial sections to see if this assumption is correct.

Pneumococcus Meningitis and Endocarditis. Report of Twenty Cases of Pneumococcus Meningitis, With and Without Pneumococcus Endocarditis. Consideration of Treatment and Review of Literature. By H. I. GOLDSTEIN and H. Z. GOLDSTEIN (International Clinics, Vol. III, Series 37).

Pneumococcus meningitis is not very common, but occurs sufficiently frequently to make it a subject of importance for discussion. Until recently the diagnosis of pneumococcus meningitis was regarded as a death warrant, but during recent years a number of recoveries have been reported, following various lines of treatment. A review of the literature of the subject is given. The authors report cases of

their own observation. As a result of their extensive study and analysis of the subject they present the following conclusions. It appears from the study of the literature and the results of various methods of treatment, that the early repeated spinal and cisternal lavage and drainage, the injection intraspinally and intracisternally of serum or antibody solution and the joint use of ethylhydrocuprein hydrochloride injections offer the best chance of saving the patients suffering from pneumococcus meningitis. Those cases failing to show improvement should have intraventricular injections and lavage through the fontanelle or trephine opening; and possibly also intravenous and intracisternal injections of ethylhydrocuprein solution, mercurochrome—220, neutral acriflavine or metaphen. It is possible with early diagnosis and prompt and active treatment to save some cases of pneumococcus meningitis. Early drainage, and even continuous drainage, will probably give the best results. There are on record in the literature about 150 cases of recovery from proved pneumococcus meningitis.

Gastric and Duodenal Ulcer. By A. WINKELSTEIN (Arch. Int. Med., 1926, 37, p. 541).

The study of gastric and duodenal ulcer shows that superficial erosions and ulceration of gastric and duodenal mucosa result from a great variety of causes, local and general, but that these tend to heal perfectly in the majority of individuals. In a certain number, however, healing is delayed or does not take place, and the lesion progresses and finally shows the characteristics of

a chronic peptic ulcer. It is this particular feature that constitutes the essential disease entity of peptic ulcer. The problem of gastric and duodenal ulcer becomes, therefore, centralized about this phenomenon of delayed or inhibited process of repair. Numerous theories have been offered in explanation. The commonly accepted opinion that local conditions are responsible for the interference with the normal process of healing seems inadequate. Other theories suggest some general bodily condition interfering with the normal physiologic course of healing, or that such inhibition of healing may be due to an excessive response to stimuli on the part of nerves and tissues, either locally or generally. Tetany, related conditions, disturbance of the vegetative nervous system, or a combination of these factors have been adduced in explanation of this hypothetic over-excitability. When patients with

gastric or duodenal ulcer, or with gastric neuroses, were tested, with controls, by various stimuli it was found that practically all ulcer patients respond excessively to mechanical, electrical and pharmacologic stimulation. Patients with gastric neurosis react in the same way, except to mechanical stimuli. They present, however, a marked contrast to the ulcer group in that they present well-defined stigmata of an abnormal vegetative nervous system. Winkelstein believes that this may prove to be of use clinically in differentiating the two conditions. Even after a surgical cure the over-excitability of the ulcer patient persists and this may be interpreted as indicating that it is the result of a constitutional factor, and not due to the presence of the ulcer. This paper may be taken as evidence of the rapidly growing view that peptic ulcer has a constitutional foundation.

Reviews

Modern Medicine. Its Theory and Practice.

In Original Contributions by American and Foreign Authors. Edited by SIR WILLIAM OSLER, Bart., M.D., F.R.S., Late Regius Professor of Medicine in Oxford University, England; Honorary Professor of Medicine in the Johns Hopkins University, Baltimore; Formerly Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia, and of the Institute of Medicine in McGill University, Montreal, Canada. Third Edition, Thoroughly Revised. Re-edited by Thomas McCrae, M.D., Professor of Medicine in the Jefferson Medical College, Philadelphia; Fellow of the Royal College of Physicians, London; Formerly Associate Professor of Medicine, the Johns Hopkins University. Assisted by Elmer H. Funk, M.D., Assistant Professor of Medicine, Jefferson Medical College Philadelphia. Volume IV, Diseases of the Respiratory System—Diseases of the Circulatory System. Pages 1011, Figures 104. Lea and Febiger, Philadelphia, 1927. Price in cloth, \$9.00.

Volume IV of the revised third edition of this well-known standard work of reference in internal medicine opens with a chapter on the Physiology of Respiration by G. W. Norris and T. M. McMillan. This is a new article replacing the one by Brown in the second edition, and represents a re-working of the old chapter, especially with reference to the physiology of respiration according to Haldane's views. The more recent work of Gesell on the respiratory mechanism is not mentioned. Chapter II treats of the Diseases of the Nasopharynx, Pharynx and Tonsils, and is written by Francis R. Packard. With the exception of two new paragraphs on Vincent's Angina and the so-called Agranulocytic Angina, the material in this chapter remains practically the same as in

the old edition, and cannot be said to have been fully brought up to date. Chapter III is by H. S. Birkett on Diseases of the Larynx; and its material is practically identical with that in the old except for the introduction of a paragraph on the use of heliotherapy and ultra-violet irradiation in the treatment of laryngeal tuberculosis. Chapter IV is on Hypersensitiveness of the Respiratory Tract, Hay Fever and Asthma, by Francis M. Rackemann. This is practically composed of new material and is an adequate discussion of the subject according to modern conceptions of these conditions. It is one of the best written chapters in this volume of the new edition, and is a sane discussion of the complex questions involved. Chapter V, on Diseases of the Bronchi, by Alexander McPhedran has been in part rearranged and new matter added, chief of which are the effects of war gases on the bronchi and Castellani's views and classification of hemorrhagic bronchitis. Inasmuch as the latter conditions are more or less rare, and their etiological foundation not in all cases secure, it might have been more useful to have given this space to some of the more important things omitted, as for instance, the X-ray findings in cases of foreign bodies in the bronchi. Chapter VI by H. A. Hare remains practically the same as in the old edition. Very little new matter has been added, and almost the only changes are in the omission of a small amount of unimportant material and some word changes. This section has not been brought up to date. The paragraph on Pneumoconiosis has been replaced by a more modern article on the subject by H. R. M. Landis, constituting Chapter VII. This is well written and adequate. Chapter VIII, Diseases of the Pleura, by F. T. Lord, also remains practically the same material as in the old edition, the new material added

being chiefly concerned with the differential diagnosis of subdiaphragmatic abscess. The next chapter, also by Lord, on Pneumotherapy has been increased by some new material on differential diagnosis. Chapter X, on Diseases of the Mediastinum, by H. A. Christian has some new matter included. Chapter XI, Diseases of the Diaphragm, by H. R. M. Landis, is wholly new material. Part II deals with the Circulatory System. Chapter XII, General Considerations in Cardiovascular Disease, by C. F. Hoover, has been recast and condensed. Diseases of the Pericardium are discussed by A. McPhedran in Chapter XIII. Very little has been added to the old material, and the section on tuberculous pericarditis has been omitted. With the exception of a paragraph on Quinidine Therapy, T. Lewis's Chapter XIV, on the Rate and Mechanism of the Heart Beat, remains practically as in the old edition. Chapter XV, Diseases of the Myocardium, by R. H. Babcock, has been much improved by having been brought up to date in its clinical portions, but from the standpoint of the pathology of the myocardium is lacking both in material and the proper interpretation of certain clinical conditions. Chapter XVI, Acute Endocarditis, by James B. Herrick, is new matter and presents this subject adequately and sanely. It is a good practical presentation of the essential clinical facts. Chapters XVII, XVIII and XIX, on Hypertrophy, Insufficiency and Dilatation, and Valvular Diseases have been rewritten by A. G. Gibson. These chapters are written from a modern standpoint, and are excellent. Gibson is one of the few writers on the heart who appears to recognize the important role played by syphilis in the production of cardiac and arterial disease. Chapter XX, Functional Disease of the Heart, by C. F. Hoover, is also an excellent treatment of this difficult subject. Chapter XXI, consisting of 200 pages on Congenital Cardiac Disease, by Maude E. Abbott, is a masterly article, and covers this ground more fully than any other previously published work upon this subject. It alone is worth the price of the volume, if such a mercenary view be permissible. It is par-

ticularly complete in its anatomical details and in the clinical picture of each form of congenital heart lesion. If anything is lacking in making this a wholly complete treatment of the subject it is in the discussion of the etiology and pathogenesis of congenital cardiac lesions. As a matter of fact we have little positive knowledge of these, and it is very likely that Dr. Abbott has given us all of importance that is really known about these subjects. Chapter XXII, Diseases of the Arteries, and Chapter XXIII, Aneurism, are by C. P. Howard. The subjects are covered adequately, particularly the last one. The volume closes with Chapter XXIV, Thrombosis, Embolism and Phlebitis, by G. Blumer, and Chapter XXV, Diseases of the Lymphatic Vessels, by A. S. Warthin. Both of these chapters have been brought up to date by the insertion of new material. Altogether the volume is very satisfactory and contains much valuable material not available in a compact form elsewhere. It is inevitable in a work of this kind that the discussion of any given subject must lag somewhat behind the current medical writings of the present time. For this reason writers of articles omitting discussion of the most recent work may appear to be negligent in not bringing their articles up to the minute. On the other hand, the greater part of current writings on medical research are only of transient significance, even though they be highly advertised. Much safer is the textbook article that is built up on researches that have weathered the test of time and experience. The Osler Modern Medicine may be commended for the safe conservatism of most of its articles.

Goiter and Other Diseases of the Thyroid Gland. By ARNOLD S. JACKSON, M.D., Jackson Clinic, Madison, Wisconsin. 401 pages, 151 illustrations. Paul B. Hoeber, Ind., New York, 1926. Price in cloth, \$8.00.

In his introduction the author states his convictions as to the importance of goiter to the nation. One of the objects of his book is to break down the old theory that

the goiter of youth is merely a physiological enlargement of the thyroid gland which would in time spontaneously disappear. Jackson believes that many of the goiters now requiring surgical operation might have been cured had it not been for the too-prevalent acceptance of these misconceptions. He offers the following classification of goiter: colloid, adenomatous (simple or toxic) and exophthalmic. He believes that iodine should be administered as a preventive to all children between the ages of eight and twenty who live in the goiter belt. Iodine will not effect a cure in the presence of an adenomatous goiter regardless of its size; but if the patient is kept under close observation, it may be given in small amounts merely to retard the growth of the adenoma until the age of twenty-one. The use of iodine in the prevention of goiter after this age is contraindicated because it is no longer of value as a preventive; it has no permanent effect in the treatment of colloid goiter, and iodine hyperthyroidism may easily be induced. The one exception to the rule that iodine should not be administered to adults is found in the treatment of exophthalmic goiter before and after operation. The diagnosis in these cases must be clearly established before the use of iodine is justified. The prevention and treatment of colloid goiter is a purely medical problem and involves a comprehensive system of organization throughout the goiter area. Adenomatous goiters should be considered as potential sources of hypertension, nephritis, myocarditis and malignancy, and as such should receive early surgical treatment. Exophthalmic goiter is a surgical disease, and for its successful treatment requires the close cooperation of the internist with the surgeon. There are twenty-one chapters in this monograph, dealing respectively with the normal thyroid and its functions, the history, geographical distribution, etiology, classification, symptomatology, diagnosis and treatment of goiter, thyroiditis, myxedema, cretinism, metabolic rate, use of iodine, the heart in toxic goiter, surgical treatment, surgical complications and mortality factors. These subjects are very thoroughly presented. The book is well printed; the il-

lustrations are numerous and of fair quality, but some of them are not convincing. In Fig. 97 a hyperplastic germinal center of a lymph node is labelled lymphosarcoma. The pathology is borrowed largely from McCarty. There is apparently no conception of any constitutional basis for the conditions of exophthalmic goiter and toxic adenoma. The relationship of these to the thymico-lymphatic constitution is not considered. The prevailing medical and surgical conceptions of these diseases are accepted by the author and nothing new of any importance is added. He is clinically sound on all points relating to the use and abuse of iodine, and his emphasis of these constitutes the chief service of this book.

Approaching Motherhood. Question and Answers of Maternity. By GEORGE L. BRODHEAD, M.D., Consulting Obstetrician, Bellevue and Allied Hospitals, Harlem Division; Visiting Obstetrician, Knickerbocker Hospital, New York. Third Edition. 193 pages. Paul B. Hoeber, Inc., New York, 1927. Price in cloth, \$1.50.

The previous edition was reviewed in these columns, and the reviewer can only repeat here what was said before as to the practical value of this little volume. It is a clear and simple answer to the questions of the expectant mother, telling her not only what she should know, but explaining also the fallacy of many popular beliefs. Opportunity has been taken by the author to make a few minor corrections in this edition.

Disorders of the Nose, Throat and Ear. Problems of Deafness. By AARON ROTH, M.D., F.A.C.S., Attending Ear and Throat Surgeon, Jewish Hospital, Brooklyn. Assistant Chief of Staff, Ear, Nose and Throat Department, Brownsville, E. N. Y. Hospital, Brooklyn. 238 pages, 29 original illustrations by the author. Physicians and Surgeons Book Company, Brooklyn, New York, 1927. Price, \$2.50.

This little treatise was primarily designed for the layman and the educator interested in the subjects discussed, but in the belief that it would also prove profitable to the

medical student as auxiliary reading and to nurses and general assistants associated with the specialty of otolaryngology. It aims to present the essential facts pertaining to the mechanism of the organs of smell, voice and hearing; and to point out the general functions of these structures under normal and abnormal conditions, and to indicate some of the natural processes of healing and scientific principles of prevention and repair. It is a condensed manual of the ground it aims to cover. It is non-technical and in the popular science form, and is illustrated by simple original drawings. A survey of the material shows much useful information expressed in a simple form. There are many evidences of good common-sense views, and the reviewer noted no signs of any effort to promote any especial fad of treatment. Too elementary for a medical student or practitioner, the simple presentation offered here of the most important facts of this specialty should be of service to nurses.

Tobacco and Physical Efficiency. A Digest of Clinical Data (With Annotated Bibliography.) By PIERRE SCHRUMPF-PIERON, M.D., Professor of Clinical Medicine, University of Cairo. Published under the Auspices of The Committee to Study the Tobacco Problem. 134 pages. Paul B.

Hoebner, Inc., New York, 1927. Price in cloth, \$1.85.

The Committee to Study the Tobacco Problem offers this volume not as an expression of any opinion of its own on the effects of tobacco on the animal organisms, but as a concise review of many opinions, often conflicting, of many authors. The review of the foreign literature has been made by Dr. E. L. Fisk. Seven hundred and fifty bibliographic references give evidence of the thoroughness of the attempt to present all of the data concerning the effects of the use of tobacco. The facts concerning these effects have not been easy to get at; and this book attempts to present an unbiased and truthful summary of all the scientific work that has been done in this line. Because of the active propaganda for and against the use of tobacco and with its constantly increasing use it is desirable that the subject be thoroughly investigated and seriously discussed. In this volume are presented the known facts giving a definite foundation on which to base opinions and arguments. The physician will find here the data that will enable him to answer questions continually addressed to him as to the good or evil effects of the use of tobacco. They are given here from a purely scientific standpoint wholly free from prejudice or exaggeration.